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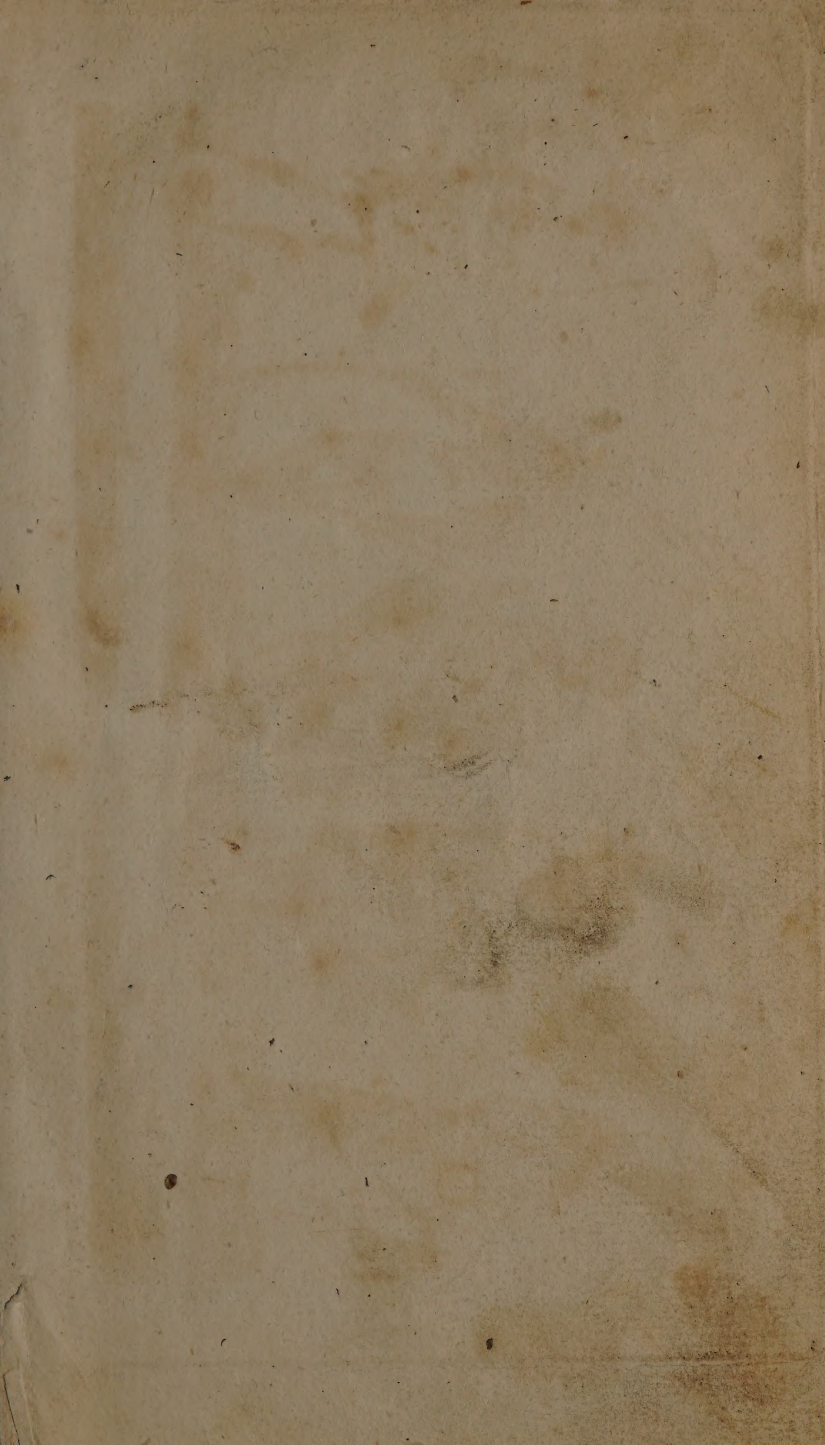
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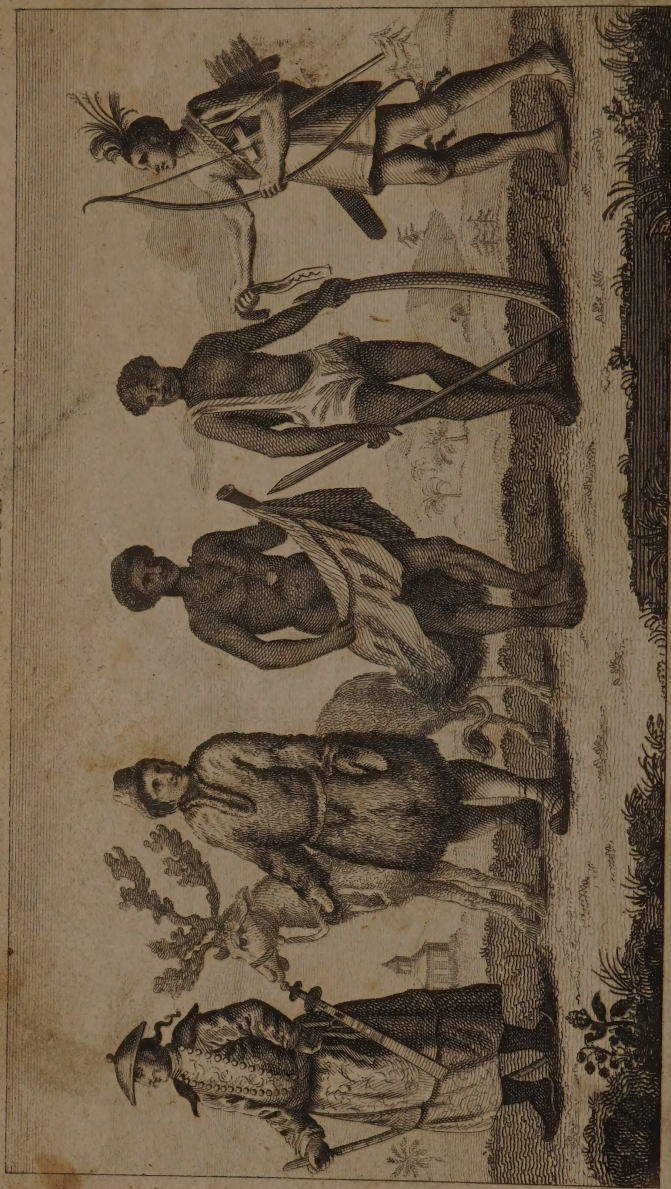
NATURAL HISTORY

OF

THE



FRONTISPIECE



CHINESE.

LAPLANDER.

GONTENTOT.

AFRICAN.

AMERICAN.

B U F F O N ' s
N A T U R A L H I S T O R Y,
A B R I D G E D.

I N C L U D I N G T H E H I S T O R Y

O F T H E E L E M E N T S,
T H E E A R T H, A N D I T S C O M -
P O N E N T P A R T S,
M O U N T A I N S, R I V E R S, S E A S,
W I N D S,
W H I R L W I N D S,
W A T E R S P O U T S,
V O L C A N O E S,
E A R T H Q U A K E S,

O F M A N,
Q U A D R U P E D S,
B I R D S,
F I S H E S,
S H E L L - F I S H,
L I Z A R D S, A N D
S E R P E N T S ;
W I T H A G E N E R A L V I E W O F
T H E I N S E C T W O R L D.

I L L U S T R A T E D W I T H
A G R E A T V A R I E T Y O F C O P P E R - P L A T E S,
E L E G A N T L Y E N G R A V E D.

A N E W E D I T I O N.

L O N D O N:
P R I N T E D F O R C. A N D G. K E A R S L E Y,
N O. 46, F L E E T - S T R E E T.



A D V E R T I S E M E N T.

THOUGH the Natural History of M. DE BUFFON is one of the most beautiful productions of the present age, yet none appeared better calculated for abridgment. If it contains much useful fact, and much animated and elegant description, it also contains much visionary theory, and much fruitless speculation. In forming this abridgment, therefore, little more was necessary than to omit these useless parts, and to simplify the language, so as to suit the understandings of young persons.

No part, indeed, of this volume, will, we flatter ourselves, be found in the least difficult to be comprehended by the youngest class of readers, if we perhaps except the four first pages. Without these the work would have been incomplete, and these it will be

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easy

easy for them to omit for the present, and to reserve till their judgments shall be more matured.

We would not, however, be understood to insinuate, that this publication is solely intended for the use of young persons—every reader who wishes to obtain in an easy and agreeable manner, a general knowledge of natural history, will find in this abridgment every material fact, every thing which it is necessary for mankind in general to know upon these subjects.

In order to complete the view of Nature, which M. DE BUFFON had left imperfect, we have had recourse to that agreeable writer, Dr. GOLDSMITH, from whose entertaining History of Animated Nature, several of the latter chapters are chiefly extracted.

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NATURAL

NATURAL HISTORY.

CHAP. I.

*Of attraction—repulsion—elements—heat—air—water—earth
—the form, composition, &c. of the earth.*

THE known powers of nature may be reduced to two primitive forces, *attraction* and *repulsion*. The first is the cause of weight or gravity; in other words, it is by the attraction which exists between the mass of earth, and all bodies on its surface that every thing has a natural tendency downward, that all matters fall to the ground, &c. The second principle is the cause of elasticity, and prevents the matter of the universe becoming a solid mass, by counteracting the effects of attraction.

The most ancient authors have agreed in supposing that there are four distinct species of elementary matter, viz. fire, air, water and earth.

There is reason to believe that fire or heat is the only permanently elastic substance in nature. We see that when it penetrates the pores of any body, it uniformly expands it. A bar of iron is lengthened by being heated, metals and other substances are melted by it, and water is converted into vapour. There is therefore ample grounds for believing that all fluidity is the effect of heat. The natural state of water is ice; and air itself, were there any means of producing a sufficient degree of cold, might probably be reduced to a solid mass.

As all fluidity has heat for the cause, by comparing some fluids together, we find, that much more heat is requisite to keep iron in fusion than gold, much more to keep gold there than tin, much less to keep wax, much less to keep water, much less for spirit of wine, and at last exceedingly

less for mercury *; since it does not lose its fluidity but at 187 degrees below that where water loses its fluidity; this matter, mercury, would be therefore the most fluid of all bodies, if air was not still more so. Now, what does this fluidity greater in air, than in any other matter, indicate? It appears, that it supposes the least degree of adherence possible between its constituting parts, that can be conceived, by supposing them of such a figure as only to be touched at one point. The greater or lesser fluidity does not, however, indicate that the parts of the fluid are more or less weighty, but only that their adherence is so much the less, their union so much the less intimate, and their separation so much the easier. If a thousand degrees of heat is required to keep water fluid, it, perhaps, will only require one to preserve that of air.

It is doubtful whether light consist of the same matter with elementary fire or not. The great source of light is found to be the sun, from whose body it is projected in the space of seven minutes and a half, and as the sun is computed to be distant 36 millions of miles, the light must of consequence travel at the rate of about 80,000 miles in one second of time.

Light may be reflected as well as projected. The light which we receive from the moon is only reflected as from a mirror. The light of the sun is 300,000 times stronger than the light of the moon.

Air is the food of fire; for by uniting with combustible matters, the air is destroyed or condensed, and the fire which kept it in a state of elasticity is therefore emitted. No combustibles will burn in vessels from which the air is excluded.

It is vulgarly supposed, that flame is the hottest part of fire, yet nothing is worse founded than this opinion; for the contrary may be demonstrated by the easiest and most familiar experiments. Offer to a straw fire, or even to the flame of a lighted fagot, a cloth to dry or heat, double and treble the time will be required to give it the degree of dryness or heat, that would be given to it by exposing it to a brasier without flame, or even to a very small heat. Flame has been exceedingly well characterized by Newton, where he defined it a burning smoke (*flamma est fumus candens*) and this smoke, or vapour, which burns, has never the same quantity, the same intensity of heat, as the

* Quicksilver.

combustible body from which it escapes. Only by being carried upwards, and extending itself, it has the property of communicating fire, and of carrying it farther than the heat of the brasier does, which alone might not be sufficient to communicate it when even very near.

Like all other matters, air is expanded by an increase of the matter of fire or heat introduced between its particles. Air is therefore said to be rarefied by being heated. The greatest degree of cold that ever has been known, is not sufficient to destroy the spring of air. As the particles of air are subject to the laws of gravitation, air is likewise expanded or rarefied by a decrease of its mass or quantity; for instance, if a quantity of the superior air be removed, the pressure on that below is proportionably decreased, and from its inherent elasticity, it is rarefied, or the particles removed at a greater distance from each other. Thus also the receiver of an air-pump, after a considerable quantity of the air is pumped out, still continues in reality full of air, though that air is of a thinner consistency.

Air not only contributes to combustion, but also to animal and vital heat. Animals, which have lungs, and which, consequently, respire air, have always more heat than those which are deprived of it; and the more the internal surface of the lungs is extended and ramified in a greater number of cells, the more, in one word, it presents a greater superficies to the air which the animal draws by inspiration; the more also its blood becomes hotter, and the more it communicates heat to all parts of the body it nourishes, and this proportion takes place in all known animals. Birds, relatively to the volume of their body, have lungs considerably more extended than man or quadrupeds. Reptiles, even those which have a voice, as frogs, have instead of lungs a simple bladder. Insects which have little or no blood, pump the air only by some pipes, and these have little animal heat. Thus, by taking the degree of the temperature of the earth for the term of comparison, I have observed, that this heat being supposed ten degrees, that of birds was nearly thirty-three, that of some quadrupeds more than thirty-one and a half, that of man thirty and a half, or thirty-one; whereas, that of frogs is only fifteen or sixteen, that of fishes and insects eleven or twelve; that is to say, the least of all, and very nearly the same as that of vegetables. Thus the degree of heat in man and animals, depends on the force and extent of the lungs: these are the bellows of the animal machine; they support and aug-

ment the fire according as they are the more or less powerful, and their motion more or less ready.

Vegetables and most insects have in the room of lungs, only aspiratory tubes or pipes, a kind of tracheas, by which they pump up the air which is necessary for them; it is seen to pass in very sensible balls into the pith of the vine; it is not only pumped up by the roots, but often even by the leaves; it forms a part, and a very essential part, of the food of the vegetable, which assimilates, fixes, and preserves it.

It was already intimated, that heat is the efficient cause of all fluidity, and that ice is the natural state of water; by adding to the quantity of heat, water is rendered elastic and volatile; that is, is converted into vapour, which is again condensed into water, when the superfluous heat is withdrawn.

One property of water it is necessary to notice, and that is, that it will always rise to the level of its source, when conveyed in pipes, or other close channels. This property is owing to the pressure of the atmosphere, which pressing equally on all parts, will force the fluid from the source through whatever channels it is to pass, till it meet with an equal resistance from the pressure of the atmosphere at the other end. This is the principle on which fountains and jets-d'eau are constructed.

When the pressure of the atmosphere is removed, water will rise in a tube to the height of 36 feet. This is owing to the pressure of the atmosphere on the source of the water; and on this principle the common pumps are constructed.

Water constitutes, if not the principal, at least, a considerable, part of the food of vegetables. It is the medium by which a certain class of animals, on this account termed aquatic, respire; its utility to man as well in diluting his food, as in increasing his enjoyments in various modes, it would be tedious and useless minutely to describe. A quantity of air is generally contained in water.

The other matters of which this universe, at least that part of it which is visible to us, is composed, may be reduced to three classes. 1st. Those which are purely combustible, such as are all animal and vegetable matters: 2dly. Those which may be reduced to a calx or cinder, such as most of the metals: 3dly. Those on which fire appears to have no effect, and produces no alteration of weight, such as the precious metals, gold for instance.

Another

Another division has been adopted by chemists, who divide all uninflamable matter into the vitrifiable (or that which is convertible into glass) and the calcareous, or that which is convertible into lime.

Thus crystals, precious stones, free-stone, granites, porphyries, agates, gypsums, argots, lava, pumice stone, with all metals and other minerals, are vitrifiable either by the fire of our furnaces, or that of burning mirrors; whereas marble, alabaster, chalk, marl, and other substances which proceed from the waste shells and madrepores, cannot be reduced into fusion by these means. Nevertheless, I am persuaded, that if we attain the point of still increasing the power of our furnaces, and especially our mirrors, we shall obtain the point of fusing these calcareous matters which appear to be of a different nature from the rest; since there are a multiplicity of reasons to think, that at the bottom their substance is the same, and that glass is the common basis of all terrestrial matters.

In the great mass of solid matter, which earth represents to us, the superficial matter is the least pure earth. All matters deposited by the sea in form of sediment, all stones produced by shell animals, all substances composed by the combinations of the waste of the animal or vegetable kingdom: all those which have been changed by volcanean fires, or sublimed by the internal heat of the globe, are mixed and transformed substances; and although they compose very great masses, they do not clearly enough represent to us the element of earth: they are vitrifiable matters, whose mass is one hundred thousand times more considerable than other substances, which should be regarded as the true basis of this element: at the same time, it is those which are composed of the most fixed earth, those which are the most ancient, and, nevertheless, the least changed: it is from this common foundation, all other substances have derived the basis of their solidity; for all fixed matter, ever so much decomposed, reduces ultimately into glass by the sole action of fire: it retakes its first nature when it is disengaged from fluid or volatile matters which were united with it: and this glass, or vitreous matter, which composes the mass of our globe, so much the better represents the element of earth, as it has neither colour, odour, taste, liquidity, nor fluidity, qualities which all proceed from the other elements, or belong to them.

The surface of this globe is divided, from one pole to the other, by two immense bands of earth, and two of

water. The first and principal of these portions of earth is that which is called the ancient continent, and which includes Europe, Asia, and Africa. This continent, if measured from the two extreme corners, that is, from the most eastern point of Tartary to the Cape of Good Hope, will produce a line of 3600 leagues; and if measured according to the meridian, that is, directly from north to south, we shall find that there are only 2500 leagues from the northern Cape of Lapland to the southernmost point of the Cape of Good Hope. The utmost breadth of this continent, that is, from the western coast of Africa to Trefana, as far as Nifingpo, on the east coast of China, is about 2800 leagues. Another line may be drawn also from Brest in Brittany, as far as the coast of Chinese Tartary, to the extent of 2300 leagues. The old continent, on the best calculations, may be said to contain 4,940,780 square leagues, which is about a fifth part of the surface of the globe.

The new continent, so called because more recently discovered, goes under the general name of America, and is divided into north and south. Its greatest length may be estimated from the mouth of the river Plata in Paraguay to the lake of the Asseniboils, which amounts to about 2500 leagues. The new continent is supposed to contain 2,140,212 square leagues. The whole superficial contents, therefore, of both the old and new continents are about 7,080,993 square leagues, not near a third of the surface of the globe, which contains 25,000,000 square leagues.

The ancients were acquainted but with a small part of the globe. All America, the Magellanic, and a great part of the internal regions of Africa, was entirely unknown to them. They only knew that the torrid zone was inhabited, although they had navigated around Africa; for it is 2200 years since the new King of Egypt gave vessels to the Phenicians which departed from the Red Sea, coasted round Africa, doubled the Cape of Good Hope, and having employed two years in this voyage, the third year they entered the straits of Gibraltar*. Nevertheless, the ancients were not acquainted with the property which the load-stone had, of turning towards the poles, although they knew that it attracted iron. They were ignorant of the general cause of the flux and reflux of the sea; they were not certain the ocean surrounded the globe without

* See Herod. Lib. iv.

interruption; some indeed suspected it, but with so little foundation, that no one dared to say, or even conjecture it was possible to make a voyage round the world. Magellan was the first who made it A.D. 1519 in 1124 days. Sir Francis Drake was the second in 1577, and he did it in 1056 days; afterwards Thomas Cavendish made this great voyage in 777 days, in the year 1586. These famous travellers were the first who demonstrated physically, the globular form and the extent of the earth's circumference: for the ancients were far from having a just measure of this circumference, although they had travelled a great deal. The general and regulated winds, and the use to be made of them in long voyages, were also absolutely unknown to them; therefore, we must not be surprized at the little progress they made in Geography, since at present, in spite of all the knowledge we have acquired by the aid of mathematical sciences, and the discovery of navigators, many things remain still to be found, and vast countries to be discovered.

As there is so large a portion of the globe with which we are unacquainted, particularly near the poles, where the ice has never permitted any navigator to penetrate, we cannot exactly know the proportion between the surface of the earth, and that of the sea; only as much as may be judged by inspection of what is known, there is more sea than land.

If we would have an idea of the enormous quantity of water which the sea contains, let us suppose one common and general depth to the ocean; by computing it only at 200 fathom, or the 10th part of a mile, we shall see that there is sufficient water to cover the whole globe to the height of 600 feet of water, and if we would reduce this water into one mass, we shall find that it forms a globe of more than 60 miles diameter.

The form of the earth is not that of a perfect globe, but rather what is termed a spheroid, a globe which is flattish at the poles, the axis, therefore, or line which may be supposed to pass through it at the equator, is to its axis at the poles in the proportion of 230 to 229. The solid parts of the earth are formed of beds or strata of different materials, which lie one upon another in a regular order. The first stratum consists of mold, or common soil, mixed with a variety of decayed vegetable and animal matters, and with stony and sandy particles. In different parts of the world the other strata are found to

consist of different materials, and differently disposed. In some parts the strata are horizontal, in others they are inclined; and veins or fissures of metals, coals, and other minerals, frequently penetrate through the different beds or strata to a great depth, and divide them. At Marly-la-Ville in France, the following strata were found. It is a high country, but flat and fertile. The strata were here arranged horizontally. From the shells which were found in No. 16, we may conjecture, that at some period the soil of Marly-la-Ville was the bottom of the sea, but has since been raised to the height of 75 feet.

The state of the different Beds of Earth found at Marly-la-Ville, at the depth of 100 feet.

	Feet	Inch.
I. A free reddish earth, mixed with much dirt, a very small quantity of vitrifiable sand and somewhat more calcinable sand - - - - -	13	0
II. A free earth or soil mixed with more gravel, and a little more vitrifiable sand - - - - -	2	6
III. Dirt mixed with vitrifiable sand in a very great quantity, and which made but very little effervescence with aqua fortis - - - - -	3	0
IV. Hard marl, which made a very great effervescence with aqua fortis - - - - -	2	0
V. Pretty hard marly stone - - - - -	4	0
VI. Marl in powder, mixed with vitrifiable sand - - - - -	5	0
VII. Very fine vitrifiable sand - - - - -	1	6
VIII. Marl in earth, mixed with a little vitrifiable sand - - - - -	3	6
IX. Hard marl, in which was real flint - - - - -	3	6
X. Gravel, or powdered marl - - - - -	1	0
XI. Eglantine, a stone of the grain and hardness of marble, and sonorous - - - - -	1	6
XII. Marly gravel - - - - -	1	6
XIII. Marble in hard stone, whose grain was very fine - - - - -	1	6
XIV. Marl in stone, whose grain was not so fine - - - - -	1	6
XV. More grained and thicker marl - - - - -	2	6
XVI. Very fine vitrifiable sand, mixed with sea fossil shells, which had no adherence with the sand, and whose colours were perfect - - - - -	1	6
XVII. Very small gravel or fine marl powder - - - - -	2	0
XVIII. Marl in hard stone - - - - -	3	6
XIX. Very		

MATERIALS OF THE GLOBE.

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XIX. Very large powdered marl	- - - -	I	6
XX. Hard and calcinable stone like marble	- -	I	6
XXI. Grey and vitrifiable sand mixed with fossil shells, particularly oysters and muscles, which have no adherence with sand, and which are not petrified	- - - - -	3	0
XXII. White vitrifiable sand mixed with shells	- - - -	2	0
XXIII. Sand streaked red and white, vitrifiable and mixed with the like shells	- - - - -	I	0
XXIV. Larger sand, but still vitrifiable, and mixed with the like shells	- - - - -	I	0
XXV. Grey, fine and vitrifiable sand mixed with the like shells	- - - - -	8	6
XXVI. Very fine fat sand, where there were only a few shells	- - - - -	3	0
XXVII. Free-stone	- - - - -	3	0
XXVIII. Vitrifiable sand, streaked red and white	- - - - -	4	0
XXIX. White vitrifiable sand	- - - - -	3	6
XXX. Reddish vitrifiable sand	- - - - -	15	0

Total depths when they left off digging 101 ft.

In a trench made at Amsterdam to make a pit, the earth was dry to the depth of 230 feet, and the strata of earth were found as follows: 7 feet of vegetable or garden earth, 9 feet turf, 9 feet soft clay, 8 feet sand, 4 feet earth, 10 feet sand, on which it is customary to fix the piles which support the houses of Amsterdam; then 2 feet argile, 4 of white sand, 5 of dry earth, 1 of soft earth, 14 of gravel, 8 argile, mixed with earth; 4 of gravel, mixed with shells; then clay 102 feet thick, and at last 31 feet sand, at which depth they ceased digging.

Every stratum, whether horizontal or inclined, has an equal thickness throughout its whole extent: that is to say, every bed of any matter whatsoever, taken separately, has an equal thickness throughout its whole extent; for example, when the bed of stone in a quarry is three feet thick in one part, it will have the same thickness throughout: if in one part it is found to be six feet thick, it will be so throughout. In the quarries about Paris the bed of good stone is not thick, and scarcely 18 or 20 feet thick; in other quarries, as those of Burgundy, the stone is much thicker; it is the same with marble; the black and white marble have a thicker bed; the coloured are commonly thinner,

thinner, and I know beds of very hard stone, which the farmers in Burgundy make use of to cover their houses, that are not above an inch thick. The thickness of different beds, therefore, are different, but each bed preserves the same thickness throughout its extent; in general it may be said, that the thickness of the horizontal strata is so greatly varied, that it is found from one line and less to 1, 10, 20, 30, or 100 feet thick; the ancient and modern quarries which are horizontally dug; the perpendicular and other divisions of mountains, prove that there are extensive strata in all directions.

The different strata of which the earth is composed, are not disposed according to the order of their specific weight; for we often find strata of heavy matters placed on strata of lighter. To be assured of this, we have only to examine the nature of the earth on which rocks are placed, and we shall find that it is generally clay which is specifically lighter than the matter of the rock. In hills and other small elevations, we easily discover the base on which rocks are placed; but it is not so with large mountains, not only the summit is rock, but those rocks are placed on other rocks; there are mountains upon mountains and rocks upon rocks, to such a considerable height, and in so great an extent of ground, that we can scarcely be certain where there is earth at bottom, and of what nature it is. We see picked rocks which are many hundred feet high; these rocks rest on others, which perhaps are no less; nevertheless, may we not compare great with small? and since the rocks of little mountains, whose bases are to be seen, rest on earth less heavy and solid than stone, may we not suppose that the base of high mountains is also of earth?

In a soil where flint is generally the predominant stone, the country is generally fertile, and if the place is uncultivated, and these stones have been long exposed to the air, without being moved, the upper superficies is always very white, whereas the opposite side, which touches the earth preserves its natural colour. If the blackest, and most flinty flint be exposed to the weather, in less than a year, its surface will change colour, and if we have patience to pursue this experiment, we shall see it by degrees lose its hardness, transparency, and other specific characters, and approach every day nearer and nearer the nature of argile.

What happens to flint, happens to sand; each grain of sand may be considered as a small flint, and each flint as a mass of grains of sand, extremely fine, and exactly grained.

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The example of the first degree of decomposition of sand is found in the brilliant and opaque powder called *Mica*, in which potters earth and slate are always diffused. The entirely transparent flints, the *Quartz*, produce, by decomposition, fat and soft talk, as petrifiable and ductile as clay: and it appears to me that talk is a mediate term between glass or transparent flint and argile; whereas coarse and impure flint, by decomposing, passes to potters earth without any intermedium.

Our factitious glass proves also the same alterations: it decomposes in the air, and perishes in some manner by remaining in the earth. At first its superficial scales exfoliate; by working it we perceive brilliant scales fly from it; but when its decomposition is more advanced, it crumbles between the fingers, and is reduced into a very white fine talky powder: and art has even imitated nature in the decomposition of glass and flint.

C H A P. II.

Of mountains—rivers—seas—lakes—their nature and properties.

WERE the earth an even and regular plain, instead of that beautiful variety of hills and valleys; of verdant forests, and refreshing streams, which at present delight our senses, a dismal sea would cover the whole face of the globe, and at best it would be only the habitation of fishes.

It is not therefore to be supposed that even in its origin the surface of the earth was perfectly regular; and since its first production a variety of causes, the motion of the waters, the subterraneous fires, the wind, and other circumstances have greatly contributed to the increase of this irregularity:

The greatest inequalities are the depths of the ocean, compared to the elevations of mountains; the depth is very different even at great distances from land; it is said there are parts above a mile deep, but these are few, and the most general profundities are from 60 to 150 fathom. The gulphs bordering on the coasts are much less deep, and the straits have generally the least depths.

The highest mountains in Asia are Mount Taurus, Mount Imaus, Caucasus, and the mountains of Japan; all these mountains are loftier than those of Europe: the
highest

highest mountains in Africa, i. e. the great Atlas, and the mountains of the moon, are at least as high as those in Asia, and the highest of all are in South America, particularly those of Peru, which are more than 3000 fathom high, above the level of the sea. In general the mountains between the tropics are loftier than those of the temperate zones, and these more than those of the frigid zones, so that the nearer we approach the equator, the greater are the inequalities of the earth: these inequalities, although very considerable with respect to us, are nothing when considered with respect to the terrestrial globe. Three thousand fathom difference to 3000 leagues diameter, is one fathom to a league, or one foot to 2300 feet, which on a globe of $2\frac{1}{2}$ feet diameter, does not make the 6th part of a line. Thus the earth, which appears to us crossed and cut by the enormous height of the mountains, and by the frightful depth of the sea, is nevertheless, relatively to its volume, only very slightly furrowed with irregularities, so very trifling, that they can cause no difference to the figure of the globe.

In continents the mountains are continued, and form chains. In islands they appear to be more interrupted and isolated, and generally raised above the sea, in form of a cone or pyramid, and are called *peaks*. The peak of Teneriffe is one of the highest mountains on the earth; it is near a mile and a half high perpendicular from the level of the sea; the peak of St. George in one of the Azores; the peak of Adam in the island of Ceylon is also very lofty. All these peaks are composed of rocks, heaped one upon the other, and they vomit from their summits fire, cinders, bitumen, minerals, and stones. There are even islands which are precisely only as tops of mountains, as the island of St. Helena, Ascension, most of the Azores, and Canaries; and we must remark, that in most of the islands, promontories, and other projecting lands in the sea, the middle is always the highest, and they are generally separated by chains of mountains, which divide them in their greatest length, as the Grampian mountains in Scotland, which extend from east to west, and divide Great Britain into two parts; it is the same with the islands Sumatra, Lucon, Borneo, Celebes, Cuba, and St. Domingo, and also Italy, which is traversed through its whole length by the Apenine mountains, &c.

The precipices which are between rocks, are formed by the sinking of rocks, the base of which sometimes gives way
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more on one side than the other, by the action of the air and frost, which splits and divides them; and by the impetuous fall of torrents, which opens passages, and carries along with them all that opposes their violence. But these abyſſes, that is to say, these vast and enormous precipices found at the summit of mountains, and to the bottom of which it is not possible sometimes to descend, although they are above a mile or half a mile round, have been formed by the operation of fire. These abyſſes were formerly the funnels of volcanos, and all the matter which is there deficient, has been ejected by the action and explosion of these fires, which are since extinguished through a defect of combustible matter. The abyſs of mount Ararat, of which M. Tournefort gives a description in his voyage to the Levant, is surrounded with black and burnt rocks, as one day the abyſſes of Etna, Vesuvius, and other volcanos will be, when they have consumed all the combustible matters they include.

In Plots' natural history of Staffordshire, a kind of gulph is spoken of, which has been founded to the depth of 2600 perpendicular feet, without meeting with any water; nay, the bottom was not found, as the rope was not long enough.

Great cavities and deep mines are generally in mountains, and they never descend to a level with the plains; therefore by these cavities, we are only acquainted with the inside of a mountain, and not at all with the internal part of the globe.

It was for a long time thought that the chains of the highest mountains run from west to east, till the contrary direction was discovered in the new world; but no person before Mr. Bourguet discovered the surprizing regularity of the structure of those great masses: he found, after having crossed the Alps, thirty times in fourteen different parts, twice over the Apenine mountains, and made divers tours in the environs of these mountains, and in mount Jura, that all mountains are formed nearly after the manner of works of a fortification. When the body of the mountain runs from east to west, it forms prominences, which face as much as possible the north and south; this admirable irregularity is so striking in valleys, that we seem to walk in a very regular covered way; if, for example, we travel in a valley from north to south, we perceive that the mountain which is on the right forms projections or angles which front the east, and those of the
mountain

mountain on the left front the west, so that, in fact, the salient angles of each side reciprocally answer the returning angles, which are always alternately opposed to them. The angles which mountains form in great valleys are less acute, because the direction is less steep, and as they are farther distant from each other; and in plains they are not so perceptible as in the course of rivers, which generally take up their elbows; the middle of them naturally answer to the most striking projections, or the most advanced angles of mountains; and this is the cause of the serpentine course of rivers. It is astonishing so visible a thing has not been observed, and when in a valley the inclination of one of the mountains which border it, is less steep than that of the other, the river takes its course much nearer the steepest mountain, and does not flow through the middle.

It may in general be said, that in Europe, Asia, and Africa, the rivers, and other mediterranean waters, extend more from the east to the west than from north to south, which proceeds from the chains of mountains being for the most part so directed, and that in other respects the whole continent of Europe and Asia is broader in this direction than the other; for there are two modes of conceiving this direction. In the long and narrow continent of South America, there is only one principal chain of mountains, that is, from east to west, or from west to east; in fact, it is in this direction all the rivers of America flow, because, excepting the Cordilleros, there are no very extensive chains of mountains, and none whose directions are parallel to them. In the old as well as the new Continent, most of the waters have their greatest extent from west to east, and most of the rivers flow in this direction, which is caused by another reason, i. e. that there are many long chains of mountains parallel to each other, whose direction is from west to east, and because the rivers and other streams are obliged to follow the intervals which divide these chains of mountains, consequently one single chain of mountains, directed from north to south, will produce rivers, whose direction will be the same as that of those which issued from many chains of mountains, whose common direction is from east to west; and it is for this particular reason, that the rivers of America have this direction in common with those of Europe, Africa, and Asia.

A remarkable phenomenon has been observed with respect to rivers, and that is, that in the inland parts and at a distance

a distance from the sea, they flow in a direct line, but in proportion as they approach their mouths they assume more of a winding or serpentine course. In large rivers there is a considerable eddy along the banks; and the nearer the sea the greater is this eddy. The surface of the water in rivers is by no means level from bank to bank; on the contrary, the middle of the stream is higher or lower than the water of the sides according to circumstances. When a river swells suddenly by the melting of snow or any other cause, the middle of the stream is sensibly higher than the sides: in one instance the elevation is said to have been as great as three feet. On the other hand, when rivers approach their mouths, the water near the sides is commonly more elevated than that in the middle.

The swelling of the Nile and its inundations has a long time employed the learned; most of them have looked upon it as marvellous, though one of the most natural things, and what is every day to be seen in every country throughout the world. It is the rain which falls in Abyssinia and Ethiopia which causes the swelling and inundation of that river, though the north wind must be regarded as the primitive cause. 1st, Because it drives the clouds which convey this rain from the coast of Abyssinia: 2ndly; because blowing against the two mouths of the Nile, it causes the waters to return against the stream, and thus prevents them from pouring into the sea in too great a quantity: this circumstance may be every year relied on, when the wind being at the north, and suddenly veering to the south, the Nile in one day loses what it gathered in four.

By a nice calculation it is supposed that the quantity of water which a river equally rapid with the Po, would convey to the ocean, would be in the proportion of a cubical mile in 26 days; and that all the rivers in the globe would, in the space of 112 years, supply the sea with 21,372,626 cubical miles of water, which is about equal to its whole contents.

There results from this calculation, that the quantity of water evaporated from the sea, and which the winds convey on the earth, producing rivulets, streams, and rivers, is from 20 to 21 inches a year, or about two-thirds of a line each day; this is a very trifling evaporation when even doubled or trebled, in order to estimate the water which falls back into the sea, and which is not conveyed over the earth. Mr. Halley has demonstrated that the vapours

which rise above the sea, and which the winds convey over all the earth, are sufficient to form all the rivers, and to contain all the waters which are on the surface of the earth.

In the old continent there are about 430 rivers, which fall directly into the ocean, or into the Mediterranean and Black Sea, and in the new continent, scarcely 180 rivers are known, which fall directly into the sea: but in this number I have comprehended only the great rivers. All these rivers carry to the sea a great quantity of mineral and saline parts, which they have washed from the different soils through which they have passed. The particles of salt which it is known are easily dissolved, are conveyed to the sea by the water. Some naturalists, and among the rest Halley, have pretended that the saltiness of the sea proceeded only from the salts of the earth, which the rivers transport thither. Others assert, that the saltiness of the sea is as ancient as the sea itself, and that this salt was created only that it might not corrupt, but it may be well supposed that the sea is preserved from corruption by the agitations of the wind, and the flux and reflux, as much as by the salt it contains; for when it is kept in a barrel, it corrupts in a few days, and Boyle relates that a mariner becalmed for 13 days, found at the end of that time the sea so infected, that if the calm had not ceased, the greatest part of his people on board would have perished. The water of the sea is also mixed with a bituminous oil, which gives it a disagreeable taste, and renders it very unhealthy. The quantity of salt contained in sea water, is about 1-40th part, and the sea is nearly equally saline throughout at top as at the bottom, under the line, and at the Cape of Good Hope, although there are several parts, as on the Mosambique Coast, where it is saltier than elsewhere. It is also asserted not to be so saline under the Arctic Zone, which may proceed from the great quantity of snow, and the great rivers which fall into those seas, and because the heat of the sun produces but little evaporation there, in comparison of the evaporation in hot climates.

There are rivers which lose themselves in the sands, and others which seem to precipitate into the bowels of the earth: the Guadalquiver in Spain, the river Gottenburg in Sweden, and the Rhine itself lose themselves in the earth. It is asserted, that in the west part of St. Domingo, there is a mountain of a considerable height, at

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the foot of which are many caverns or rivers, and the rivulets fall with so much noise, as to be heard at the distance of seven or eight miles.

The ocean surrounds the whole earth without any interruption of continuity, and the tour of the globe may be made by passing the point of South America, but it is not yet known whether the ocean surrounds the northern part of the globe in the like manner; and all mariners who have attempted to go from Europe to China by the north-east or north-west, have alike miscarried in their enterprises.

The seas which are called Mediterranean, are properly branches from the great ocean, by which they are supplied. Lakes differ from the Mediterranean seas, because they do not receive any water from the ocean; for on the contrary, if they have communication with the seas, they furnish them with water; thus the Black Sea, which some geographers have regarded as a connection with the Mediterranean, and consequently as an appendix of the ocean, is only a lake; because, instead of receiving water from the Mediterranean, it supplies it with some, and flows with rapidity through the Bosphorus into the lake called the sea of Marimora, and thence through the strait of the Dardanelles into the Grecian sea. The water of the Black Sea appears to be less clear, and much less saline than that of the ocean. No island is to be met with throughout this sea: tempests are very violent here, and more dangerous than in the ocean; because the whole body of the waters being contained in a basin, which may be said to have no outlet, they have a kind of whirling motion, when they are agitated, which strikes the vessels on every side with an insupportable violence.

Next to the Black Sea, the greatest lake in the universe is the Caspian sea, whose extent in length from north to south is about 300 leagues, and scarcely more than fifty broad, computing it in a moderate proportion. This lake receives one of the greatest rivers in the world, i. e. the Volga; also some other considerable rivers, as the Keir, the Fay, and the Gempo; but what is singular, is, that it does not receive any on its eastern side throughout this whole length of 300 leagues. There are some small islands in the Caspian sea, and its waters are much less saline than those of the ocean; storms are here very dangerous, and large vessels are not used for navigation therein, as it is

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shallow,

shallow, and many banks and shoals are scattered under the surface of the water.

There are lakes which like pools, do not receive any river, and from which none go out. There are others which do receive rivers, and from which others run; and lastly, some which only receive rivers. The Caspian sea and the lake Aral are of the last kind, they receive the waters of many rivers, and contain them. Thus the Dead sea receives the Jordan, though no river goes from it. In Asia Minor there is a small lake of the like kind, which receives the waters of a river the source of which is near Congi, and which, like the preceding, has no other mode than evaporation, to throw off the waters it receives; there is one much larger in Persia, on which the town of Marago stands, its figure is oval, and it is about ten or twelve leagues long, by six or seven broad; it receives the river Tauris, which is not very considerable. There is also a similar small lake in Greece, about 12 or 15 leagues from Lepanto, and there are some of the same species both in Africa and America.

The most general and largest lakes, however, are those which having received another river, or many small rivers, give rise to other great rivers. It is worthy of remark that all lakes from which rivers derive their origin; all those which fall into the course of rivers, and which carry their water thereto, are not saline, and almost all those, on the contrary, which receive rivers, without other rivers issuing from them, are saline, which seems to favour the opinion we have laid down on the subject of the saltness of the sea, for evaporation cannot carry off fixed salts, and consequently those which rivers carry into the sea remain therein; and although river water appears to taste sweet, we well know that it contains a small quantity of salt, and in course of time the sea must have acquired a considerable degree of saltness, which must still continue increasing. It is thus therefore, as I imagine, that the Black Sea, the Caspian sea, the lake Aral, the Dead sea, &c. are become salt.

The lakes which are any ways remarkable, are, the Dead sea, the waters of which contain much more bitumen than salt; this bitumen, which is called the *Bitumen of India*, is no other than the Asphaltum, which has caused some authors to call this sea, *Lake Asphaltum*. The land which borders on this lake contains a great quantity of bitumen, and many have applied the fables to this lake,

which the poets feign of the lake Avernus, that no fish could live therein, and that birds which attempted to fly over it were suffocated; but neither of these lakes produce such mortal events; fish live in both, birds pass over them, and men bathe in them without the least danger. A petrifying lake in Iceland, is also mentioned, and the lake Neagh in Ireland has also the same property of apparently turning wood, &c. into stone; but these petrifications are no other than incrustations like those made by the water of Arcueil.

CHAP. III.

Of winds, regular and irregular—monsoons—hurricanes—whirlwinds—water-spouts.

NOTHING is more irregular in our climates than the course of the winds; but there are countries where this irregularity does not exist, but where the wind blows constantly in one uniform direction.

There are several causes which influence the motions of the air, but the most powerful is the heat of the sun, which by rarefying the air, produces an influx of the cold air, which is a heavier fluid, and consequently presses in upon that which is rarefied and light, and produces a stream or current of air. In the torrid zone this effect is more uniformly manifest than in other parts of the world. In the regions near the equinoctial line, a continual rarefaction is produced by the sun, and a constant current of air follows that luminary in his progress from east to west. This easterly wind blows so generally in the Pacific Ocean, that the ships which sail from Acapulca to the Philippines, perform a voyage of 2700 leagues in less than two months.

About 28 or 30 degrees on this side of the line, the west winds are equally constant, and for this reason, the vessels returning from the West Indies to Europe do not pursue the same route as in going out.

The winds which blow continually for some months, are generally followed by contrary winds, and mariners are obliged to wait for that which is favourable to them; when these winds change, a calm or dangerous tempest ensues for several days, and sometimes a month.

These general winds, caused by the rarefaction of the

atmosphere, combine differently by different causes in different climates; in part of the Atlantic sea, under the temperate zone, the north wind blows almost constantly during the months of October, November, December, and January, which is the reason why these months are the most favourable to embark from Europe to India, in order to pass the line by the favour of these winds; and it is known by experience, that ships which quit Europe in the month of March do not arrive sooner at Brazil than those which sail in the month of October. The north wind almost continually reigns during winter in Nova Zembla, and the other northern coasts: the south wind blows during the month of July to Cape Verd, when the rainy season, or winter of these climates sets in: at the Cape of Good Hope the north west wind blows during the month of September: at Patna, in India, this north west wind blows during the months of November, December, and January, and produces heavy rains; but the east wind blows during the other nine months.

In the kingdom of Guzarat, and on the coasts of the neighbouring sea, the north winds blow from the month of March till the month of September; and during the other months of the year south winds almost always reign. The Dutch, to return from Java, generally set sail in the month of January or February by an easterly wind which is felt as far as 18 degrees northern latitude, after which they meet with the south winds which carry them to St. Helena.

In the Mediterranean, the winds blow from the land towards the sea at the sun's setting, and, on the contrary, from the sea towards the land at its rising; so that in the morning it is an easterly wind, and in the evening a westerly wind; the south wind, which is rainy, and which generally blows at Paris, Burgundy and Champagne at the beginning of November, and which cedes to mild and temperate breezes, produces the fair weather vulgarly called the summer of St. Martin's.

On the sea, the winds are more regular than at land, because the temperature of the sea is more equal than that of the land, as the temperature of the latter is altered by a variety of causes; such as electricity, volcanoes, exhalations from the earth, the explosion of meteors, &c.

In general, on the sea, the east wind and those which come from the poles, are stronger than the west and those which proceed from the equators. On the land, on the contrary,

contrary, the west and south winds are more or less violent than the east and north winds, according to the situation of the climates.

Contrary currents are often observed in the air; clouds which move in one direction, and others which are higher or lower than the first, which move in a contrary direction; but this contrariety of motion does not remain very long, and is commonly produced only by the resistance of some clouds to the action of the wind, and by the re-action of the direct wind, which reigns solely as soon as the obstacle is dissipated.

The winds are more violent in mountainous places than in plains; and the higher we ascend, the more the power of the wind increases, until we reach the common height of the clouds; that is to say, to about one quarter or one third of a league perpendicular height; beyond that height, the sky is generally serene, especially in summer, and the wind is said to be even imperceptible on the tops of mountains.

A current of air increases in velocity, like a current of water, where the space of its passage is straitened; the wind which is scarcely perceptible in a wide and open plain, the same wind which was moderate in an open plain, becomes violent in passing through a narrow passage between two mountains, or simply between two lofty buildings; and the point of the most violent action of the wind is above these structures or mountain straits. The air being compressed by the resistance of these obstacles, has a greater mass, density and the same velocity subsisting; the effort or gust of wind, the *momentum* becomes much stronger; this is the cause that near a church, or a castle, the winds seem to be much stronger than they are at a certain distance from these edifices. I have often remarked, that the wind being reflected by an isolated building, does not prevent it from being more violent than a direct wind, which produced this reflected wind; and since I have endeavoured to discover the reason of this, I have been able to find no other than the above; the impelled air compresses against the building, and is reflected, not only with its former velocity, but also with a greater body, which, in fact, renders its action much more violent.

Particular winds, whether direct or reflected, are more violent than those which are general. An uniformly continued stream of air produces not such havoc as the fury of those winds which blow in sudden gusts. The predominancy of certain winds, in certain parts, has occasioned a

general division of them into zones, though it is not to be understood that their effects are invariable. The east wind, which extends 20 or 30 degrees on each side the equator, may be said to occupy the torrid zone. The north wind occupies the frigid zone; and with respect to the temperate zone, the winds which reign there, are, if I may use the expression, only currents of air, whose motion is composed of those two winds whose direction tends to the west; and with respect to the westerly winds, whose direction tends to the east, and which often reign in the temperate zone, whether in the Pacific or Atlantic oceans, they may be considered as winds reflected by the continents of Asia and America, but originally derived from the east and north winds.

The monsoons, or trade winds, are subject to deviations. Some continue for a longer, some for a shorter time; and they also differ in their extent, and in their degree of violence. In the Indian ocean, for instance, between Africa and India, as far as the Moluccas, the east winds begin to reign at the month of January, and last till the beginning of June. In the month of August or September, the contrary motion begins; and the west winds reign during three or four months. In the intervals of these monsoons, that is to say, at the end of June, in the month of July, and beginning of August, there is no wind on that sea; but they have violent storms, which come from the north.

There are winds which may be regarded as particular to certain coasts; for example, the south wind is almost continual on the coasts of Chili and Peru; it begins at the 46th degree, or thereabouts, south latitude, and extends beyond Panama, which renders the voyage from Lima to Panama much easier performed than the return. The western winds blow almost continually, or at least very frequently, on the Magellanic coasts, and over the environs of the strait of Maire; the north and north-west winds almost continually reign on the Malabar coast; the north-west wind is also very frequent on the coast of Guinea; and at a certain distance from that coast, in the open sea, we meet with the north-east wind very frequently. The westerly winds reign on the coasts of Japan, in the months of November and December.

The alternate or periodical winds, which we have just been speaking of, are sea winds; but there are also land winds, which are periodical, and return either at a certain season, or in certain days, or even at certain hours; for
example,

example, on the Malabar coast, from the month of September to April a land wind blows from the eastern side; this wind generally commences at midnight and finishes at noon, and is not felt beyond 12 or 15 leagues from the coast, and from noon till midnight a weak sea wind reigns, which comes from the west: on the coast of New Spain in America, and on that of Congo in Africa, land winds reign during the night, and sea winds during the day: at Jamaica the winds blow from all quarters at once during the night, and vessels cannot then come in. nor depart from it with safety in the day time.

The winds are however more irregular on the land than on the sea, and more irregular in the higher lands than in plains. The mountains not only alter the direction of winds, but even they produce winds, which are either constant or variable according to different causes; the melting of the snow, which is upon the mountains, generally produces constant winds, which sometimes remain very long; the vapours which are stopt by mountains which accumulate there, produce variable winds, very frequent in all climates. In the straits, on all the projecting coasts, at the extremity and in the environs of all promontories, peninsulas and capes, and in all narrow gulphs, storms are frequent: but beyond that there are seas much more tempestuous than others. The Indian ocean, the Japan sea, the Magellanic sea, that of the African coast beyond the Canaries, and on the other side towards the country of Natolia, the Red sea, &c. are very liable to storms. The Atlantic ocean is more stormy than the ocean, which is called from its tranquillity, the *Pacific Sea*; nevertheless this Pacific sea is not absolutely tranquil, except between the tropics, and about the temperate zones; and the more we approach the poles, the more we are subject to variable winds, whose sudden change often causes tempests.

All terrestrial continents are subject to variable winds, which often produce singular effects: in the kingdom of Cassimir, which is surrounded by the mountains of Caucasus, a very sudden reverse of seasons is felt. In less than an hour's journey on mount Pirepenjale we pass from summer to winter. A north and a south wind blow perceptibly within 200 paces of one another on the mountains of Gatela of India, the extreme heats of summer are felt on one side of the mountain, and all the rigours of winter

on the other. The same phenomenon is also observed at Cape Rozalgate in Arabia, and on the island of Ceylon.

In Egypt during summer, hot south winds very commonly prevail, which disturb the respiration, and raise so great a quantity of sand, that the sky seems covered with thick clouds; this sand is so fine, and driven with such force, that it penetrates every where, even into the closest coffers. When these winds last many days they cause epidemical diseases, which are often followed by a great mortality.

The Cape of Good Hope is famous for its tempests, and the singular cloud which produces them: this cloud appears at first only like a small round spot in the sky, called by the sailors *the Ox's Eye*, and which I imagine appears so minute from its exceeding great height. In Natolia a small cloud forms like the Ox's eye at the Cape of Good Hope, and from this cloud issues a terrible wind, which produces similar effects. In the sea between Africa and America, especially under the equator and in the neighbouring parts of it, these kind of tempests very often arise; near the coast of Guinea sometimes three or four of these storms are formed in a day; they are caused and announced, like those of the Cape, by small black clouds: the rest of the sky is generally very serene, and the sea calm. The first blast which issues from these clouds is furious, and would sink ships in open sea, if they did not take the precaution to furl the sails: it is principally in the months of April, May and June that these tempests are experienced on the Guinea sea, because no regular wind blows there during the season.

All these tempests are produced by winds which issue from a cloud, and their direction, is either to the north or south, north east or south west, &c. but there are other kinds called *hurricanes*, which are still more violent than these, and in which the winds seem to proceed from all the coasts; they have a whirling motion which nothing can resist. A calm generally precedes these horrible tempests, and the sea then appears as a piece of sea: but in an instant the fury of the winds raises waves as high as the clouds. There are parts of the sea, where we cannot land, because alternately there are always calms and hurricanes of this kind: the Spaniards have therefore called these places *calms and tornados*.

When from a sudden rarefaction, or any other cause, contrary currents of air meet in the same spot, a whirlwind

is produced. Perhaps the same effect takes place in another element, and gulphs or whirlpools may be no other than the eddies of the water formed by the action of two or more opposite currents: the Euripus, so famous for the death of Aristotle, alternately absorbs and rejects the water seven times in twenty-four hours; this gulph is near the Grecian coast. The Charybdis, which is near the strait of Sicily, rejects and absorbs the water thrice in twenty-four hours: on the whole we are not quite certain of the number of alternatives of motion in these gulphs. The greatest known gulph is that of the Norway sea, which is affirmed to be upwards of twenty leagues in circuit. It absorbs for six hours all what is nigh it, water, ships, &c. and afterwards returns them in the same quantity of time as it drew them in.

A waterspout is no other than a whirlwind at sea. The vacuum which is caused by the meeting currents causes the water to rise up in the form of a cylinder, or rather of an inverted cone. In the travels of M. Thevenot there is a very minute and circumstantial account of the formation of a waterspout, though there is reason to suspect that the relation is not without some optical deceptions.

The first, says this celebrated voyager, which appeared to me was on the northern coast, between us and the island Quesomo, at a gun-shot from the ship, the head of the ship was then to the north east: we directly perceived water which boiled on the surface of the sea about a foot high, it was whitish, and appeared above that height like a thick black smoke, so that it properly resembled some burning straw, which only smoked; it made a noise like that of a torrent which runs with much rapidity in a deep valley: but this noise was mixed with a clearer, similar to the strong hissing of serpents or vipers; a little while afterwards we perceived something like a dark canal, which bore a strong resemblance to a smoke which ascends towards the clouds turning round with great velocity; this appeared about the thickness of my finger, and the same noise still continued; the duration of this spout was no longer than about half a quarter of an hour: this over, we perceived another on the south side of us, which began in the same manner as the preceding: and almost as soon, a like one made its appearance on the west side; and directly after a third by the side of this second, the farthest of the three might be about a musket shot distance from us: they all three appeared like burning heaps of straw, a foot

and a half or two feet high. We afterwards saw as many canals which descended from the clouds, on those places where the water was raised up, and each of them was as broad at the end fastened to the cloud, as the broad end of a trumpet, and resembled the breast or teat of an animal, drawn perpendicularly down by an heavy weight; these canals appeared of a darkish white, and were not strait, but crooked in some places, they even were not perpendicular; but on the contrary, from the clouds where they were joined to the parts, which drew in the water, they were very much bent; and what is more particular, is that the cloud which the second of these three was fastened to, having been driven by the wind, this canal followed it without breaking or quitting the place where it drew in the water, and passing behind the first canal, they were sometimes crossed like a St. Andrew's Cross. At the beginning they were all three about the thickness of my finger, but afterwards the first of the three increased considerably: but the last which was formed scarcely remained longer than that which we saw on the north side. The second on the south side remained about a quarter of an hour, but the first on that side remained a little longer, and this it was which terrified us the most. At first its canal was as thick as my finger, afterwards as thick as my arm, then as my leg, and at last as the trunk of a large tree, which a man might compass with his arms. We distinctly perceived water through this transparent body which ascended in a serpentine manner. Sometimes it diminished a little in size, sometimes at top and sometimes at bottom, then it resembled exactly a soft tube with some fluid matter pressed with the fingers, either upwards, to make this liquor descend, or at bottom, to cause it to ascend. After this it diminished so much that it was thinner than my arm; afterwards it returned as thick as my thigh, and then again became very thin; at last, I saw that the water elevated on the surface of the sea began to lower, and the end of the canal which touched it divided and grew narrower, when a variation of the light removed it from our view.

C H A P. IV.

Of volcanoes—earthquakes—the formation of new islands—caverns and grottoes—bogs and fens—mutations of land into sea, &c.

THE burning mountains called volcanoes, include in their bowels sulphur, bitumen, and matters which serve as aliment to a subterraneous fire, the effect of which is more violent than that of gunpowder or even of thunder. A volcano is a cannon of an immense volume, the orifice of which is often more than half a league: this mouth vomits forth torrents of smoke, flame, rivers of bitumen, sulphur, and melted metal, clouds of cinders and stones, and sometimes it ejects enormous rocks to many leagues distance, which human powers united could not move: the combustion is so terrible, and the quantity of burnt, melted, calcined, and vitrified matters which the mountain throws out, is so plentiful, that they enter cities, forests, cover the fields an hundred and two hundred feet in thickness, and form sometimes hills and mountains, which are only heaps of these ejected matters. The action of this fire is so great, the force of explosion so violent, that its reaction has been known to shake and move the earth, agitate the sea, overthrow mountains, and destroy the most solid towns and edifices, even to very considerable distances. The natives of Iceland imagine that the roarings of the volcano are the cries of the damned, and its eruptions the effects of the rage and despair of these unhappy wretches.

In Europe are three famous volcanos, mount Etna in Sicily, mount Hecla in Iceland, and mount Vesuvius in Italy near Naples. Mount Etna has burnt from time immemorial; its eruptions are very violent, and the matters it throws out are so plentiful, that they may be dug to the depth of 68 feet, where we meet with marble pavement, and the vestiges of an ancient town which has been covered and buried under this thickness of matter thrown out from the mount, in the same manner as the city of Herculaneum has been covered by the matter thrown out from Vesuvius. New mouths of fire were formed in 1650, 1669, and at other times: we see the flame and smoke of this volcano from Malta, which is about 60 leagues distance from it; it smokes continually, and there are times when this

this burning mountain vomits flames and matters of every kind with impetuosity. In 1537, there was an eruption of this volcano, which caused an earthquake in Sicily for 12 days, and which overthrew a very great number of houses and structures: it ceased only by the opening of a new fire mouth, which burnt every thing for five miles in the environs of the mountain; the cinders thrown out by the volcano were so abundant, and ejected with so much force, that they were driven as far as Italy; and vessels which were departed to some distance from Sicily, were incommoded by them. Farelli describes the conflagration of this mountain circumstantially, and says the foot of it is 100 leagues in circumference.

This volcano has now two principal mouths, the one narrower than the other; these two vents always smoke, but fire is never seen to issue from it, but during the time of eruptions: it is pretended that stones are found which it has thrown out to the distance of 60,000 feet *.

One of the last and most violent eruptions of mount Vesuvius was in the year 1737. The mountain vomited by divers mouths large torrents of burning metallic matters, which dispersed themselves over the country and into the sea. Mons. Montesquieu, who communicated this relation to the Academy of Sciences, observed with horror one of these rivers of fire, and saw its course for six or seven miles till it reached the sea; its breadth was sixty or seventy feet, its depth, twenty-five or thirty palms, and in certain bottoms or valleys, 220: the matter which flowed was like the scum which issues from the furnace of a forge.

In Asia as well as in America there are a great number of volcanoes; but there is nothing peculiarly worthy of remark in any, except the violence with which some of them occasionally emit the burning matters with which they are charged.

In Africa, there is a mountain, or rather a cavern called *Beniguazevel*, near Fez, which always emits smoke, and sometimes flames. One of the islands of Cape Verd, called the island of *Fuoguo*, is only a large mountain which continually burns; this volcano, like the rest, throws out many cinders and stones; and the Portuguese who have attempted several times to erect habitations in this island,

* See a most interesting description of this celebrated mountain in an elegant and entertaining production published by Mr. Kearsley, intitled, "The present state of Sicily and Malta."

have been constrained to abandon this project, through the dread of the effects of the volcano. The Canaries, the Peak of Teneriff, and some of the highest mountains of the earth, throw out fire, cinders, and large stones; from the top rivulets of melted sulphur flow, which are distinguishable at a great distance.

The matters which volcanoes throw out, generally come forth in the form of a torrent of melted minerals, which inundates all the environs of these mountains; these rivers of liquefied matters extend even to considerable distances, and by cooling, these matters in fusion, form horizontal or inclined strata, which for position are like the strata formed by the sediment left by the waters: but it is very easy to distinguish the strata produced by the expansion of matters thrown out by volcanoes, from those which have the sediment of the sea for their origin. 1. Because these strata are not throughout of an equal thickness: 2. Because they contain only matters which are evidently perceived to have been calcined, vitrified, or melted, and because they do not extend to any great distance. When coal mines are opened, which are generally met with in argillaceous earth at a great depth, it sometimes happens that these matters have taken fire; there are even mines of coal in Scotland, Flanders, &c. which have burnt for a number of years. The communication of the air suffices to produce this effect, but these fires which are lighted in these mines, produce only slight explosions, and do not form volcanos, because all being solid and full in these places, fire cannot be excited, like that of volcanos, in which there are cavities and void places where the air penetrates, which must necessarily extend the conflagration and augment the action of the fire, to the point in which we see it when it produces the terrible effects we have spoken of.

There are two kinds of earthquakes, the one caused by the action of subterraneous fires, and the explosion of volcanos, which are only felt at small distances, and at the time when volcanos act, or before they open; when the matters which form subterraneous fires, ferment, heat and inflame, the fire makes an effort on every side, and if it does not find a natural vent, it raises the earth and forms itself a passage by throwing it out, which produces a volcano, whose effects are repeated, and last in proportion to the quantity of inflammable matters. If the quantity of matters which take fire, is not considerable, a commotion or an earthquake may ensue, without a volcano being formed.

formed. The air produced and rarefied by the subterraneous fire, may also find small vents, by which it will escape, and in this case there will be only a shock without any eruption or volcano: but when the inflamed matter is in a great quantity, and confined by solid and compressed matters, then a commotion and volcano arises; but all these commotions form only the first kind of earthquakes, and can only shake a small space of ground. A very violent eruption of mount Etna will cause, for example, an earthquake throughout the whole island of Sicily; but it will never extend to the distance of three or four hundred leagues. When any new mouths are formed in mount Vesuvius, there are earthquakes at Naples and in the neighbourhood of the volcano: but these earthquakes have never shook the Alps, and are not communicated into France or to other countries remote from the source of the phenomenon.

But there is another kind of earthquake, very different in its effects, and perhaps for its causes; there are earthquakes which are felt at great distances, and which shake a long course of ground, without any new volcano or eruption appearing.

To understand rightly what may be the causes of this kind of earthquake, it must be remembered, that all inflammable matters capable of explosion, produce, like gunpowder, by inflammation, a great quantity of air; that this air produced by fire is in a state of very great rarefaction; and that, by a state of compression in which it is found in the bowels of the earth, it must produce very violent effects. Let us therefore suppose, that, at a very considerable depth, as at about one or two hundred fathoms, pyrites, and other sulphureous matters are to be met with; and that, by the fermentation produced by the filtration of the water, or other causes, they inflame; and let us see what must happen: at first, these matters are not disposed regularly by horizontal strata, as the more ancient matters are, which have been formed by the sediment of the waters; on the contrary, they are formed in perpendicular strata, in caverns at the foot of these clefts, and in other parts where the water can act and penetrate. These matters inflaming, will produce a great quantity of air or vapour, the spring of which, compressed in a small space, like that of a cavern, will not shake the earth immediately above, but will search for passages, in order to make its escape; it will therefore naturally force its way through those parts where it meets least obstruction,

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and will therefore proceed through the interstices between the different strata, or through any channel or caverns which may afford it a passage. This subterraneous air or vapour will therefore produce in its passage a noise and motion proportioned to its force and to the resistance it meets with; and these effects will continue till it finds a vent, perhaps in the sea, or till it has diminished its force by being greatly expanded. This explanation corresponds entirely with all the phenomena which are observed respecting earthquakes. They proceed with a wave-like motion, and are felt at different places, not at the same instant, but at different times, in proportion to the distance.

We can also confirm what has been advanced, by connecting it with two other circumstances. It is well known that mines exhale vapours, independent of the wind produced by the current of the water; we often see currents of unhealthy air and suffocating vapours; it is also known that there are holes, abysses and deep lakes in the earth, which produce winds, like the lake Boleslaw in Bohemia, &c.

From history we have innumerable instances of the dreadful and various effects of these terrible phenomena. Pliny, in his first book, chap. 84, relates, that in the reign of Tiberius, an earthquake happened, which overthrew twelve towns in Asia; and in his second book he mentions, in the following terms, a prodigy caused by an earthquake: he says, that by a great earthquake there were 100 towns overthrown in Lybia. In the time of Trajan, the town of Antiochus, and a great part of the adjacent country, were swallowed up by an earthquake; and, in the time of Justinian, in 528, this town was a second time destroyed by the same cause, with upwards of 40,000 of its inhabitants: and, sixty years after, in the time of Saint Gregory, it felt the effects of a third earthquake, with the loss of 60,000 of its inhabitants. In the time of Saladin, in 1182, most of the towns of Syria and Jerusalem were destroyed by the same cause. In Calabria and Poh, there have been more earthquakes than in any other part of Europe. In the time of Pope Pius XI. all the churches and palaces of Naples were overthrown, and above 30,000 of its inhabitants killed; and all those which remained alive, were obliged to live in tents, till they had rebuilt their houses. In 1629, there were earthquakes in Pola, which destroyed 7000 persons; and in 1638, the town of Saint Euphemia was swallowed up; and there remains only a stinking lake in its place.

Ragusa

Ragusa and Smyrna were also almost destroyed. There was an earthquake in 1692, which extended into England, Holland, Flanders, Germany and France; it was chiefly felt on the sea coasts and rivers, and extended to a space of at least 2600 leagues square. On the 16th of June, 1628, there was so horrible an earthquake in the island of St. Michael, that the sea near it opened, and, in one place where it was more than 150 fathoms deep, threw up an island more than a league and a half long, and upwards of 60 fathoms high.

Another earthquake happened in 1691, which began the 16th of July, and lasted in the island of St. Michael till the 12th of the following month. Tercera and Fayal were agitated the next morning with so much violence, that they appeared to move; but these frightful shocks returned only four times; whereas, at St. Michael's, they did not cease a moment for 15 hours. The islanders having quitted their houses, which they saw fall before their eyes, passed all that time exposed to the injuries of the weather. A whole town, named Villa Franca, was overthrown to its very foundation, and most of the inhabitants buried under its ruins. In many parts, the plains rose into hills; and, in others, some mountains flattened or changed situation. A spring of water issued from the earth, which flowed for four hours, and which appeared dry all on a sudden. The air and sea, still more agitated, resounded with a noise which might have been taken for the roaring of a quantity of wild beasts. Many persons died with the fright, and the ships in the ports suffered dangerous shocks; and those which were at anchor or under sail, at 20 leagues distance from the islands, suffered great damage.

In the year 1646, the mountain of the island of Machian split with terrible reports, by an earthquake; an accident which is very common in that country: so many fires issued through this opening, that they consumed many negro-yards, with the inhabitants, and all that was therein. In the year 1685, this prodigious crack was to be seen, and still is apparent; it is called the path of Machian, because it descends from the bottom like a road hollowed out, but which at a distance appears like a path.

There are earthquakes which are felt for some distance at sea. M. Shaw relates, that, in 1721, being on board the *Gazelle*, an Algerine vessel, mounting 50 guns, three violent shocks were felt one after the other, as if every time a weight of 20 or 30 tons had been thrown on the ship. This happened in a part of the Mediterranean which was 200 fathoms deep.

In countries subject to earthquakes, it happens, when a new volcano is formed, earthquakes cease, and are only felt in the violent eruptions of the volcano, as is observed in the island of St. Christopher.

New islands are produced, either suddenly by the operation of subterraneous fires, or slowly by the accumulated sediments of water. Seneca informs us, that, in his time, the island Therasia suddenly emerged from the sea; and Pliny relates, that thirteen islands arose all at once from the bottom of the Mediterranean. Upon this subject, however, we have some facts more recent, and less involved in obscurity.

The 23d of May, 1707, at the sun's rising, near this same island of Therasia, or Santorin, something was seen like a floating rock in the sea; some persons who were curious, went near it, and found this shoal, which had issued from the bottom of the sea, to increase under their feet; and they brought with them the pumice stone and oysters, which the rock still had attached to its surface. There was a slight earthquake at Santorin, two days before the growth of this shoal. This new island increased considerably till the 14th of June, without any accident, and was then half a mile round, and from twenty to thirty feet high; the earth was white, and bordered a little on argillaceous; but after that, the sea was troubled more and more; vapours arose, which infected the island Santorin; and, the 16th, 17th, or 18th of July, rocks were seen to issue at one time from the bottom of the sea; all which united and formed like one rock. All this was done with a dismal noise, which continued upwards of two months, with flames which rose from the new island; it still kept increasing in circumference and height; and the explosions always threw out rocks and stones more than seven miles distance.

The 10th of October, 1720, near the island Tercera, a very considerable fire arose out of the sea. Mariners having approached it by orders of the governor, perceived, the 19th of the same month, an island which appeared to be covered with fire and smoke, and a prodigious quantity of cinders thrown to a distance, as from a volcano, and accompanied with a noise similar to that of thunder.

On the whole, however, the islands produced by the action of fire and earthquakes, are but few, and these events are seldom; but there are an infinite number of new islands produced by the mud, sand and earth, which the rivers, or the sea carry and transport into different places. At the

mouth of all rivers, masses of earth and banks of sand are formed, whose extent often become considerable enough to form islands of a moderate size. The sea retiring from certain coasts, leaves the parts highest from the bottom naked, which form so many new islands; and so likewise, by extending itself on certain shores, it covers the lowest parts, and leaves the highest, which it could not surmount, apparent above the surface of the water, which form so many more islands: in consequence of which, it is remarked, that there are very few islands in the middle of the sea, and that they are almost all in the neighbourhood of the continents, where the sea formed them, either by retreating from, or approaching towards, these different countries.

Water and fire, whose natures are so different, and even so contrary, produce similar effects, or at least those which appear to us as such. Water, as has been observed, has produced mountains, and formed most islands. There are likewise caverns, clefts, holes, gulphs, &c. some owe their origin to subterranean fires, and others to water.

Saint Patrick's cavern, in Ireland, is not so considerable as it is famous; it is the same with the Dog's Grotto in Italy, and that which throws out fire in the mountain of Benigauzeval, in the kingdom of Fez.

One of the most remarkable and largest caverns known, is that of Antiparos, an ample description of which has been given us by M. de Tournefort. It is computed to be three hundred fathoms deep from the surface of the earth; but the grotto appears to be forty fathoms high by fifty broad; it is filled with large, beautiful stalactites, of various forms, as well on the roof of the vault as at the bottom.

In part of Greece, called Livadia, (the Achaia of the ancients) there is a large cavern, in a mountain which was formerly very famous for the oracles of Trophonius, between the lake Livadia and the adjacent sea, which, in the nearest part, is forty miles over; there are forty subterranean passages across the rock, under a lofty mountain, through which the waters of the lake continually flow.

In the month of June, 1714, a part of the mountain of Diableret in Valois, fell suddenly, between two and three o'clock in the afternoon. The sky was very serene; the mountain was of a conical figure, and destroyed fifty-three huts belonging to the boors, and crushed to death fifteen people, and more than an hundred head of large, and much more of small cattle, covering a square league with the ruins it occasioned. A profound darkness was caused by the
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the dust; the heaps of stones thrown together were above thirty perches; these heaps stopped the current of the water, which formed new and very deep lakes. In all this there was not the least trace of bituminous matter, sulphur, lime, nor consequently any subterranean fire; and apparently the base of this great rock was worn away, or perished and reduced to dust*.

We have a remarkable example of these sinkings near Folkstone, in the county of Kent. The hills in its environs have sunk gradually, by an imperceptible motion, and without any earthquake. These hills internally are rocks of stone and chalk. By this sinking, they have thrown into the sea rocks and earths which are adjacent to it.

When the waters on the surface of the earth cannot find vent to flow, they form morasses and bogs. The most famous morasses in Europe, are those of Muscovy at the source of the Tanais; those of Finland, where the great morasses of Savolax and Enafak are; there are also some in Holland, Westphalia, and many other low countries; in Asia, the morasses of the Euphrates, those of Tartary, and the Palus Meotidis; nevertheless, in general, there are fewer of them in Asia and Africa than in Europe; but America may be said to be but one continued morass, throughout all its plains. This great number of morasses is a proof of the modern date of the country, and of the small number of inhabitants, and still more of their want of industry.

To give an idea of the quantity of earth which the rain detaches from the mountains and carries along with it into the valleys, we can quote a circumstance related by Dr. Plot: he says, in his Natural History of Staffordshire, that, eighteen feet deep in the earth, a great number of pieces of money coined in the reign of Edward V. has been found; i. e. two hundred years before his time; so that this ground, which is boggy, has increased above a foot in eleven years, or an inch and a twelfth every year. We can still make a similar observation on trees buried at seventeen feet depth, below which medals of Julius Cæsar have been found; so the earth brought from the tops of mountains into plains by running waters, fail not very considerably to increase the elevation of the ground of plains.

In the city of Modena, and four miles round, whatever part is dug, when we reach the depth of sixty-three feet, and bored five feet deeper with an auger, the water springs

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* Histoire de l'Academie des Sciences, anno 1715, p. 4.

out with such force, that the well is filled in a very short space of time. This water flows continually, and neither diminishes nor increases by the rain or drought. What is remarkable in this ground, is, that when we reach the depth of fourteen feet, we find pavements, and other ruins of an ancient town, as boards, houses, different pieces of mosaic work, &c. after which we find a very solid ground, which is thought to have never been stirred; yet below it we find a moist earth mixed with vegetables; and at twenty-six feet, are entire trees, as nut-trees, with nuts on them, and a great quantity of branches and leaves of trees; at twenty-eight feet depth, we meet with a friable chalk, mixed with many shells; and this bed is eleven feet in thickness; after which, we again meet with vegetables, and so on alternately chalk and earth mixed with vegetables, to the depth of sixty-three feet; at which depth is a bed of sand mixed with some gravel and shells, like those formed on the coasts of the Italian sea. These successive beds of fenny or marshy earth and chalk, are always met with in the same order, wherever we dig; and very often the auger meets with large trunks of trees, which it bores through, and which occasions great trouble to the workmen; bones, coals, flint and pieces of iron are also found. Ramazzini, who relates these circumstances, thinks that the gulph of Venice formerly extended as far as even beyond Modena; and that, by course of time, and perhaps by the inundations of the sea, this ground has been formed.

It is evident, that considerable changes have taken place on the surface of the globe not only by the action of fire, but by water also. The sea, from various circumstances, has repeatedly changed its bed. Authors have suspected, that the island of Great Britain was formerly united to the continent of France. On the coasts of France, England, Holland and Germany, the sea has retreated in many parts. In Italy, a considerable tract of territory has been gained by the retreating of the ocean; and Ravenna, which was formerly a sea-port of the Exarques, is no longer a maritime town.

On the mountain of Stella, in Portugal, is a lake in which the wrecks of ships have been found, notwithstanding this mountain is more than twelve leagues distant from any sea. Sabinus, in his commentaries on Ovid's *Metamorphoses*, says, that by the monuments of history it appears, that in the year 1460, a whole ship, with its anchors, was found in a mine of the Alps.

C H A P. V.

On the Nature of Man.—Of Infancy.—Manhood.—Extent of Human Life.—Of the Senses.—Anecdotes illustrative of this Subject.

MAN is a being compounded of two distinct natures, body and soul. The soul exists independent of the senses, but receives all its information by their means. The leper, whose skin is dried up, has no sense of external feeling: and a man deaf from infancy, has no ideas of sounds. To give a more perfect idea of the nature of man, it will be proper to pursue him through the different stages of his existence.

At its birth, the infant is exposed to a new element, the air. What the sensations are on the admission of this element into the lungs, it is impossible to guess; but, from the cries of the infant, we may conjecture that it is attended with pain. The eyes of an infant are indeed open, but they are dull, and appear to be unfitted for the performance of any office whatever; and the outward coat of them is wrinkled. The same reasoning will apply to most of the other senses. It is not till after forty days that it begins to smile; nor is it till then that it begins to weep: its former sensations of pain are unaccompanied with tears. The size of an infant born at the full time, is twenty-one inches, though some do not exceed fourteen; and it generally weighs twelve, and sometimes fourteen pounds. The form of the body and members of a new-born infant are by no means perfect. At the end of three days, there generally appears a kind of jaundice; and at that time, there is generally milk in the breast of the infant, which is squeezed out with the fingers. The skull of infants is not completely formed: in the language of the nursery, the head is open in a particular part; that is, the skull bones have not yet grown far enough to meet. In this opening, a palpitating may sometimes be discovered; and the beating of the arteries may always be felt. Above this opening, a species of scurf appears, which is rubbed off with a brush. In this country, infants, as soon as born, are injudiciously and unnaturally laced with bandages; so that they are not able to move a single joint. Nations which we call barbarous, act more rationally and more humanely in this respect. The

Siamefe, the Indians, the Japanefe, the Negroes, the Savages of America, lay their infants naked in hanging beds of cotton, or in cradles lined with fur.

Infants sleep much, but their sleep is often interrupted. They ought to have the breaft every two hours in the day, and in the night as often as they awake. It is of great importance to keep children clean and dry from their excrements. The American Indians, who cannot change their furs as frequently as we can our cloths, put under them the duft of rotten wood, and renew it as often as it gets damp. Great evils enfue from the negligence of nurfes. Infants are sometimes left to cry for a considerable time, which often occafions difeafes, or, at leaft, throws them into a ftate of laffitude, which deranges their constitutions. To palliate this they are sometimes put into a cradle and rocked to sleep, which may occasionally derange the ftomach and head. Before children are put into the cradle, we ought to be certain that they want nothing, and when they are rocked, it ought never to be with fuch violence as to ftun or ftupefy them. The eyes of children are always directed towards the light, and if one eye only be directed to it, the other will probably become weak; both eyes ought, therefore, to be equally fhaded, or equally expofed. Squinting is commonly the effect of injudicious treatment in this refpect. For the firft two or three months the diet of the infant ought chiefly to be confined to its mother's milk.

The eight incifores, or fore-teeth, appear firft. They are produced generally by pairs, and from two months old to ten or twelve. The four canini (or dog-teeth) appear commonly about the 9th or 10th month. About the clofe of the firft, or in the courfe of the fecond year, 16 other teeth appear, called *molares*, or grinders. In the 5th, 6th, or 7th year the fore-teeth, the dog-teeth, and the firft fix of the grinders, naturally fhed, and a new fet appears. At the age of puberty, or later, the *dentes fapientiae*, or wife teeth, appear. Women are faid to have fewer teeth than men.

The hair of moft infants is exceedingly light, almoft white. When a child is fuffered to cry violently, and too long, it is in danger of a rupture, but the early application of bandages or truffes will frequently remove the complaint.

The frame of infants is lefs fenfible of cold than during any other feafon of life. The pulse is ftrong, and it is therefore

therefore fair to conclude, that the internal heat is considerable. Till the age of three years the life of infants is extremely precarious; in the course of the ensuing second and third years it becomes more certain, and at six or seven a child has a greater probability of living than at any other period of life. It is remarked that of a certain number of children born at the same time, above a fourth die in the first year; above a third in two years, and at least one half in three years. By other calculations, it appears that one half of the children born at the same time, are not extinct in less than seven or eight years.

At 12 or 15 months infants begin to lisp. A is the vowel which they pronounce with most ease. Of the consonants B, M, P, T, are most easy. In every language, therefore, *Baba, Mama, Papa*, are the first words that children learn. Some children pronounce distinctly in two years, though the generality do not speak for two years and a half, and frequently not so early.

Some young persons cease growing at 14 or 15, while others continue their growth to 22 or 23. In men the body attains its perfect proportion at the age of 30, and in women sooner. The persons indeed of women are generally complete at 20. The distance between the eyes is less in man than in any other animal; in some creatures, in fact, the eyes are at so great a distance, that it is impossible they should ever view the same object with both eyes at once. Men and apes are the only animals that have eye-lashes on the lower eyelid. Other animals have them on the upper, but want them on the lower lid. The upper lid rises and falls, the lower has scarcely any motion.

The ancients erroneously considered the hair as a kind of excrement, and believed that, like the nails, it increased by the lower part pushing out the extremity; but the moderns have discovered that every hair is a tube, which fills and receives nutriment like the other parts of the body. The roots, they observe, do not turn grey sooner than the extremities, but the whole changes colour at once. We have known instances of persons who have grown grey in one night.

There is no part of the body which has been subject to such changes of fashion as the hair and the beard. Some people, and among others the Turks, cut the hair off their heads, and let their beards grow. The Europeans, on the contrary, shave their beards, and wear their hair. The negroes shave their heads in figures at one

time, in stars at another, in the manner of friars; and still more commonly in alternate stripes; and their little boys are shaved in the same manner. The Talapoins, of Siam, shave the heads and the eye-brows of such children as are committed to their care. Every nation seems to have entertained different prejudices, at different times, in favour of one part or another of the beard.

The neck supports the head, and unites it to the body. This part is much more considerable in the generality of quadrupeds, than in man. But fishes, and other animals that have not lungs similar to ours, have no neck whatever. Birds, in general, have the neck longer than any other kind of animal: those of them which have short claws, have also short necks; those, on the contrary, that have them long, are found to have the neck in proportion.

The human breast is outwardly formed in a very different manner from that of other animals. It is larger in proportion to the size of the body; and none but man, and such animals as make use of their fore feet as hands, such as monkeys, bats, and squirrels, are found to have those bones called clavicles, or, as we usually term them, collar-bones. The breasts in women are larger than in men; however, they seem formed in the same manner; and, sometimes, milk is found in the breasts of men, as well as in those of women. Birds, and all other oviparous animals, have no teats; but viviparous fishes, as the whale and the dolphin, have both teats and milk.

There is little known exactly with regard to the proportion of the human figure; and the beauty of the best statues is better conceived by observation than by measurement. Some who have studied after the ancient masters, divide the body into ten times the length of the face, and others into eight. They tell us, that there is a similitude of proportion in different parts of the body: thus, that the hand is the length of the face; that the thumb is the length of the nose; that the space between the eyes is the breadth of the eye; that the breadth of the thickest part of the thigh is double that of the thickest part of the leg, and treble the smallest; that the arms extended are as long as the figure is high; that the legs and thighs are the length of the figure.

The strength of man is very considerable when matured by practice. We are assured, that the porters of Constantinople carry burthens of not less weight than nine hundred pounds; and M. Desaguliers tells us of a man in

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an upright posture, who, by distributing a certain number of weights, in such a manner that every part of his body bore its share, was able to support a weight of two thousand pounds.

The strength of a man may be still farther estimated by the continuance of his labour, and by the agility of his motions. Men, who are exercised in running, outstrip horses, or at least continue their speed for a greater length of time. In a journey also, a man will walk down a horse; and after they have proceeded together for several days, the horse will be quite tired, and the man will be as fresh as at the beginning. The royal messengers of Ispahan, who are runners by profession, go thirty-six leagues in fourteen or fifteen hours. Travellers assure us, that the Hottentots out-run lions in the chase; and that the savages who hunt the elk, pursue with such speed this animal, which is as fleet as a stag, that they at last tire down, and take it. The civilized man is ignorant of his own strength, nor is he sensible how much he loses of it by effeminacy, and how he might add to it by the habit of vigorous exercise.

Left our description of man should be found imperfect, it will be proper to examine the human countenance, as it appears among ourselves, when agitated by the passions. In affliction, in joy, in love, in shame, in compassion, the eyes are apt to be swelled, and in a manner obscured, by an overflow of tears. The effusion of these is always accompanied with a tension of the muscles of the visage, by which there is occasioned an opening of the mouth. At the same time, the natural moisture in the nose becomes more copious, and, by internal passages, blends itself with the lachrymal moisture; which does not, however, flow uniformly, but by intervals.

In sorrow, the two corners of the mouth are lowered, the under lip is raised, the eye-lid is half closed, the pupil of the eye is raised, and almost covered with the eye-lid, and the other muscles of the face are so much relaxed, that the space between the mouth and the eyes is larger than ordinary, and of consequence the countenance appears lengthened.

In fear, terror, or horror, the forehead is wrinkled, the eye-brow is raised, the eye-lids are as much as possible extended, and discover a part of the white of the eye over the pupil, which is lowered, and somewhat concealed by the inferior eye-lid; the mouth, at the same time is widely
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opened, and the lips being separated, both the upper and under teeth are seen.

In contempt and derision, the upper lip is raised on one side, and on the other there is a little motion, as if in order to smile; the nose is shrivelled on the same side that the lip is raised, and the corner of the mouth is extended; the eye on the same side is almost shut, while the other is open as usual, but the pupil of each is lowered, as when one looks from high to low.

In jealousy, envy, and malice, the eye-brow falls down, and is knit, the eye-lid is raised, and the pupil lowered; the under lip is raised on each side, while the corners of the mouth are rather lowered, and the middle of the under-lip is raised, in order to join the middle of the upper one.

In laughter, the two corners of the mouth are extended, and somewhat raised; the upper part of the cheeks is raised, and the eyes are more or less closed; the upper lip is raised, while the under one is lowered; and, in immoderate laughter, the mouth is opened, and the skin of the nose is contracted.

When the constitution of the body is sound, it is possible perhaps, by moderation in the passions, temperance and sobriety, to lengthen out the period of life for a few years. But even of this there seems to be an uncertainty; for, if it is necessary that the body should employ its whole strength, that it should consume whatever it is capable of consuming, that it should undergo every possible exercise, whence could any benefit accrue from regimen, and from abstinence? Men no doubt there are who have surpassed the usual period of human existence; and, not to mention Pär, who lived to the age of one hundred and forty-four, and Jenkins, to that of one hundred and sixty-five, as recorded in the Philosophical Transactions; we have many instances of the prolongation of life to one hundred and ten, and even to one hundred and twenty years. Yet this longevity was occasioned by no peculiar art or management. On the contrary, it appears, that the generality of such long-livers were peasants accustomed to the greatest fatigues, huntsmen, or labourers; men, in fact, who had employed their whole bodily strength, and even abused it, if to abuse it is possible, otherwise than by continual idleness and debauchery.

If in the duration of life there is any difference to be found, it ought seemingly to be ascribed to the quality
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of the air. In elevated situations, it has been observed, there are commonly found more old people than in such as are low. The mountains of Scotland and Wales, of Auvergne and Switzerland, have furnished more instances of extreme longevity than the plains of Holland or Flanders, of Germany or Poland. In general, however, the period of human existence may be said to be the same in every country. If not cut off by accidental diseases, Man is found to live to the years of ninety or an hundred. Beyond that date our ancestors did not live; nor has it in any degree varied since the time of David.

From a careful inspection of the registers of burials in a certain number of country parishes in France, compared with the mortality of Paris, the following table has been made out of the probable duration of human life.

TABLE

TABLE OF THE PROBABILITIES OF THE
DURATION OF LIFE.

Age.			Age.			Age.		
Duration of Life.			Duration of Life.			Duration of Life.		
Years.	Years.	Months.	Years.	Years.	Months.	Years.	Years.	Months.
0	8	0	29	28	6	58	12	3
1	33	0	30	28	0	59	11	8
2	38	0	31	27	6	60	11	1
3	40	0	32	26	11	61	10	6
4	41	0	33	26	3	62	10	0
5	41	6	34	25	7	63	9	6
6	42	0	35	25	0	64	9	0
7	42	3	36	24	5	65	8	6
8	41	6	37	23	10	66	8	0
9	40	10	38	23	3	67	7	6
10	40	2	39	22	8	68	7	0
11	39	6	40	22	1	69	6	7
12	38	9	41	21	6	70	6	2
13	38	1	42	20	11	71	5	8
14	37	5	43	20	4	72	5	4
15	36	9	44	19	9	73	5	0
16	36	0	45	19	3	74	4	9
17	35	4	46	18	9	75	4	6
18	34	8	47	18	2	76	4	3
19	34	0	48	17	8	77	4	1
20	33	5	49	17	2	78	3	11
21	32	11	50	16	7	79	3	9
22	32	4	51	16	0	80	3	7
23	31	10	52	15	6	81	3	5
24	31	3	53	15	0	82	3	3
25	30	9	54	14	6	83	3	2
26	30	2	55	14	0	84	3	1
27	29	7	56	13	5	85	3	0
28	29	0	57	12	10			

By this Table it appears, that it is reasonably to be expected, or, in other words, that we may lay our bet one to one, that an infant newly born will live eight years; that an infant of one year will live thirty-three years longer; that an infant of two years will live thirty-eight years longer; that a man of twenty will live thirty-three years and five months longer; that a man of thirty will live twenty-eight years longer; and so proportionally of every other age.

Ideas of external things are conveyed to the soul of man by means of the five senses, *seeing, hearing, feeling, tasting, and smelling*. The organs by which the senses act are the nerves, which are small thread-like fibres distributed all over the body, and all of them connected with the brain.

The eyes seem to be formed very early in the human embryo: In the chicken also, of all the parts that are double, these are the soonest produced; and I have observed upon the eggs of several sorts of birds, as well as upon those of lizards, that the eyes were much more large and early in their expansion, than any other parts of two-fold growth. Though in viviparous animals, and particularly in man, they are, at first, by no means so large in proportion as in the oviparous classes, yet they obtain their due formation sooner than any other parts of the body. Thus it is also with the organ of hearing. The little bones that help to compose the internal parts of the ear, are entirely formed before any of the other bones, however large they may afterwards become, have acquired any part of their growth or solidity. Hence it is evident, that the parts of the body, which are furnished with the greatest quantity of nerves are those which appear the soonest, and which are the soonest brought to perfection.

Mr. Cheselden, having couched for a cataract a lad of thirteen years of age, who had from his birth been blind, and thus communicated to him the sense of seeing, was at great pains to mark the progress of his visual powers; this youth, though hitherto incapable of seeing, was not, however, absolutely and entirely blind. Like every other person, whose vision is obstructed by a cataract, he could distinguish day from night, and even black from white, or either from the vivid colour of scarlet. Of the form of bodies, however, he saw nothing, nor of colours themselves, unless the light was strong. At first, the operation was performed

performed only upon one of his eyes; and when he saw for the first time, so far was he from forming the smallest conception of distances, that he supposed (as he himself expressed it) every thing he saw touched his eyes, in the same manner as every thing he felt touched his skin. The objects that pleased him most were those of which the surfaces were plain, and the figures regular; though as yet he could in no degree judge of their different forms, or assign why some were more agreeable to him than others. The ideas he had entertained of colours, during his former dark state, were so imperfect that, when he saw them in reality, he could hardly be persuaded they were the same. When such objects were shewn him as he had been formerly familiar with, by the touch, he beheld them with earnestness, in order to distinguish them a second time. As of these, however, he had too many to retain at once, the greatest number were forgotten; and for one thing which he knew, after seeing it, there were a thousand things, according to his own declaration, of which he no longer possessed the smallest remembrance. He was very much surprised to find that those persons, and those things, which he had loved best, were not the most pleasing to the eye; nor could he help testifying his disappointment in finding his parents less handsome than he had conceived them to be. Before he could distinguish that a picture resembled a solid body, above two months elapsed. Till then, he only considered it as a surface diversified by a variety of colours: but, when he began to perceive that these shadings actually represented human beings, he also began to examine, by the touch, whether they had not the usual qualities of such bodies; and great was his surprise to find smooth and even, what he had supposed a very unequal surface. He was then shewn a miniature-portrait of his father, which was contained in his mother's watch-case; and though he readily perceived the resemblance, yet he expressed his amazement, how so large a face could be comprised in so small a compass. To him it appeared as strange as that a pint-vessel should contain a bushel. At first, he could bear but a very small quantity of light, and he saw every object much greater than the life; but in proportion as he observed objects that were in reality large, in proportion he conceived the others to be diminished. Beyond the limits of what he saw, he had no conception of any thing. He knew that the apartment he occupied was only a part of the house; and yet he could not

not imagine how the latter should appear larger than the former. Before the operation, he formed no great expectations of the pleasure he should receive from the new sense he was promised. That thereby he might be enabled to read and write, was his grand object. He said, among other things, that he could enjoy no greater delight from walking in the garden, with this sense, than without it; because there he already walked at his ease, and was acquainted with all the walks. With great truth he also remarked, that his blindness gave him one advantage over the rest of mankind; an advantage which indeed he preserved for a long time after he had obtained the sense of seeing; namely, that of being able to walk in the night with confidence and security. No sooner, however, had he begun to enjoy this new sense, than he was transported beyond measure; and he declared, that every new object was a new source of delight to him; that his pleasure was so great he had not language to express it. About a year after, he was carried to Epfom, where there is a very beautiful, and a very extensive prospect: with this he seemed greatly charmed; and the landscape before him he called a new method of seeing. He was couched in the other eye, a year after the former, and of both operations the success was equally great. When he saw with both eyes every object appeared to him twice as large as when he saw but with one eye, though he did not see double, or at least he showed no marks from which any such conclusion might be drawn.

We judge of distance only by experience, otherwise the more distant an object is, the smaller it appears. When, from particular circumstances, we cannot form a just idea of distance, and when we cannot judge of objects but by the angle, or rather the image, which they form in our eyes, we are then necessarily deceived as to the size of such objects. Every man has experienced how liable we are in travelling by night to mistake a bush which is at hand for a tree which is at a distance, or indeed a tree which is at a distance for a bush which is at hand. In like manner, if we do not distinguish objects by their form, and if thereby we cannot judge of distance, the same fallacy will still remain: in this case, a fly, which may pass us with rapidity immediately before our eyes, will appear to be a bird at a considerable distance; and a horse which may be in the middle of a plain, without motion, and in an attitude similar, for example, to that of a sheep, will

appear no bigger than a sheep, till we have once discovered that it is a horse.

Whenever, therefore, we find ourselves benighted in an unknown place, where no judgment is to be formed of distance, we are every moment liable to deceptions of vision; hence originate the dreadful anecdotes of spectres; and of those strange, hideous, and gigantic figures, which so many persons tell us they have seen. Though such figures it is commonly asserted, exist solely in the imagination, yet it is highly possible, that they might appear literally to the eye, and be in every different respect seen as described to us. That this remark is consonant to truth, will be allowed to be the more probable, when we reflect, that whenever we cannot judge of an object but by the angle which it forms in the eye, this object is magnified in proportion to its propinquity; and that, if it appeared at first to the spectator who is alike incapable of distinguishing what he sees, and of judging at what distance he sees it; if it appeared to him, I say, when at the distance of twenty or thirty paces from it, a few feet high, it must appear to him, when advanced to within a few feet of it, of a size stupendously increased. At this he must naturally be astonished and terrified, till he comes to touch the seemingly gigantic object, and to distinguish it; for in the very instant that he has an actual perception of what it is, the object will diminish, and appear to him as it in reality is. If, on the other hand, he is afraid to approach it, and he flies from the spot with precipitation, the only idea he will have of what had presented itself to him, will be that of the image, which had been formed in his eye; the image of a figure he had seen, gigantic in its size, and horrible in its form. The prejudice with respect to spectres, therefore, originates from nature; and such appearances depend not, as philosophers have supposed, solely upon the imagination.

There are many reasons to induce us to suppose that such persons as are short-sighted see objects larger than others; and yet it is a certain truth that they see them less.

Error is however not confined to any one sense; and that of hearing is liable to similar mistakes with that of sight. This sense conveys no distinct intelligence of the distance whence a sounding body is heard: a great noise far off, and a small one very near, produce the same sensation; and, unless we receive information from some other sense, we can never distinctly tell whether the sound be a

great or a small one. It is not till we have by experience, become acquainted with any particular sound, that we can judge of the distance whence we hear it. When, for example, we know the tone of a bell, we are then at no great loss to determine how far it is from us.

Every body that strikes against another produces a sound, which is simple in such bodies as are not elastic, but which is often repeated in such as are. If we strike a bell, for instance, a single blow produces a sound, which is repeated by the undulations of the sonorous body, and which is multiplied as often as it happens to undulate or vibrate. These undulations succeed each other so fast, that the ear supposes them one continued sound; whereas, in reality, they form many sounds. Sounding bodies are therefore of two kinds; those unelastic ones, which being struck, return but a single sound; and those more elastic, returning a succession of sounds, which uniting together form a tone. This tone may be considered as a great number of sounds, all produced one after the other, by the same body, as we find in a bell which continues to sound for some time after it is struck. A continuing tone may be also produced from a non-elastic body, by repeating the blow quick and often, as when we beat a drum, or when we draw a bow along the string of a fiddle.

To know the manner in which musical sounds become pleasing, it must be observed, no one continuing tone, how loud or swelling soever, can give us satisfaction; we must have a succession of them, and those in the most pleasing proportion. The nature of this proportion may be thus conceived. If we strike a body incapable of vibration with a double force, or, what amounts to the same thing, with a double mass of matter, it will produce a sound that will be doubly grave. Music has been said, by the ancients, to have been first invented from the blows of different hammers on an anvil. Suppose then we strike an anvil with an hammer of one pound weight, and again with an hammer of two pounds, it is plain that the two pound hammer will produce a sound twice as grave as the former. But if we strike with a two pound hammer, and then with a three pound, it is evident that the latter will produce a sound one third more grave than the former. If we strike the anvil with a three pound hammer, and then with a four pound, it will likewise follow that the latter will be a quarter part more grave than the former. Now, in the comparing between all those sounds, it is obvious that the

difference between one and two is more easily perceived than between two and three, three and four, or any numbers succeeding in the same proportion. The succession of sounds will be, therefore, pleasing in proportion to the ease with which they may be distinguished. That sound which is double the former, or, in other words, the octave to the preceding tone, will above all others be the most pleasing harmony. The next to that, which is as two to three, or, in other words, the third, will be most agreeable. And thus universally, those sounds whose differences may be most easily compared as the most agreeable.

Sound has in common with light, the property of being extensively diffused. Like light, it also admits of reflection. The laws of this reflection, it is true, are less distinctly understood than those of light: all we know is, that sound is principally reflected by hard bodies, and that their being hollow also sometimes increases the reverberation. The internal cavity of the ear, which is fashioned out in the temporal bone, like a cavern cut into a rock, seems to be fitted for the purposes of echoing sound with the greatest precision.

One of the most common complaints in old age is deafness; which probably proceeds from the rigidity of the nerves in the labyrinth of the ear. This disorder also proceeds sometimes from a stoppage of the wax, which art may easily remedy. In order to know whether the defect be an internal or an external one, let the deaf person put a repeating-watch into his mouth; and if he hears it strike, he may be assured that his disorder proceeds from an external cause, and may be in some measure cured.

It often happens, that people hear better with one ear than another; and these it is observed, have, what musicians call, a bad ear. I have made many trials on persons thus circumstanced; and I have always found, that their defect in judging properly of sounds proceeds from the inequality of their ears, and their receiving by both at the same time, unequal sensations. In like manner, as such persons hear false, they also, without knowing it, sing false. They also frequently deceive themselves with regard to the side whence the sound comes, generally supposing the noise to come on the part of the best ear.

Hearing is a much more necessary sense to man than to animals. In these it is only a warning against danger, or an encouragement to mutual assistance. In man, it is the source of most of his pleasures; and without it the rest
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of his senses would be of little benefit. A man born deaf, must necessarily be dumb; and his whole sphere of knowledge must be bounded by sensual objects. We have a singular, and perhaps an unexampled instance of a young man, who, being born deaf, was restored, at the age of twenty-four, to perfect hearing. The account, which is given in the memoirs of the Academy of Sciences, 1703, page 18, is in substance as follows:

“A young man, of the town of Chartres, between the age of twenty-three and twenty-four, the son of a tradesman, and deaf and dumb from his birth, began to speak all of a sudden, to the utter astonishment of the whole town. He gave them to understand that, about three or four months before, he had heard the sound of the bells, and was greatly surprised at this new and unknown sensation. After some time, a kind of water issued from his left ear, and he then heard perfectly well with both. During these three months, he was sedulously employed in listening without saying a word, and accustoming himself to speak softly, so as not to be heard, the words pronounced by others. He laboured hard also in perfecting himself in the pronunciation, and in the ideas attached to every sound. At length, having supposed himself qualified to break silence, he declared, that he could now speak, though as yet but imperfectly. Soon after, some able divines questioned him concerning his ideas of his past state; and principally with respect to God, his soul, the moral beauty of virtue and deformity of vice. The young man, however, had not directed his solitary speculations into that channel. He had gone to mass indeed with his parents, had learned to sign himself with the cross, to kneel down, and to assume all the grimaces of a man in the act of devotion. But he did all this without any manner of knowledge of the intention or the cause; he saw others do the like, and that was enough for him. He knew nothing even of death, nor did it ever enter into his head; he led a life of pure animal instinct; and though entirely taken up with sensible objects, and such as were present, he yet did not seem to have made such reflections even upon these, as might reasonably have been expected. The young man was not, however, deficient in understanding; but the understanding of a man, deprived of all commerce with others, is so very confined, that the mind is in some measure totally under the control of its immediate sensations.

“ It is highly possible, nevertheless, to communicate ideas to deaf men, which they previously wanted, and even to give them very precise notions of abstract, and general subjects, by means of signs, and of letters. A person born deaf, may, by time and application, be taught to read, to write, and even, by the motions of the lips, to understand what is said to him; a plain proof how much the senses resemble, and may supply the defects of each other. It is probable, however, that, as most of the motions of speech are made within the mouth by the tongue, the knowledge from the motion of the lips, can be but very confined.

The sense of feeling is spread over the whole body, but it employs itself differently in different parts. The sentiment which results from feeling, cannot be excited otherwise than by the contact and immediate application of the superficies of some foreign body to that of our own. If we apply a foreign body against the breast, or upon the shoulder of a man, he will feel it; that is, he will know that there is a foreign body which touches him: but he will not have a single idea of the form of this body, because the breast touching the body in a single plain, or surface, he cannot gather from it, any knowledge of this body. It is the same with respect to all other parts of the body, which cannot adjust themselves upon the surface of foreign bodies, and bend themselves, to embrace at one time, many parts of their superficies. These parts of our body cannot, therefore, give any just idea of their form; but those which, like the hand, are divided into many small flexible and moveable parts; and which consequently, can apply themselves at one and the same time, upon the different plains of the superficies of the body, are those, which, in effect, give us the ideas of their form, and of their size.

It is not, therefore, only because there is a greater quantity of nervous tufts, at the extremity of the fingers than in any other part of the body; it is not, as it is vulgarly pretended, because the hand has the most delicate sense, that it is in effect the principal organ of feeling; on the contrary, we can say, that there are parts more sensible, and where the sense of feeling is more delicate, as the eyes, the tongue, &c. but it is merely because the hand is divided into many parts all moveable, all flexible, all acting at one and the same time, and all obedient to the will; it is, because, it is the only organ which gives us distinct ideas

ideas of the form of bodies. Animals which have hands, appear to be the most acute: apes do things so resembling the mechanical actions of man, that it seems as if they had the same succession of corporeal sensation for the cause of them. Animals, which are deprived of this organ, cannot have any knowledge distinct enough of the form of things; as they cannot grasp any object, and as they have not any part divided and flexible enough to be able to adjust itself upon the superficies of bodies, they certainly have not any precise notion of the form, any more than of the size of them. It is for this reason that we often see them in suspense, or frightened at the aspect of objects which they ought to be the best acquainted with, and which are the most familiar to them. The principal organ of their feeling is the muzzle, because this part is divided in two by the mouth and because the tongue is another part, that serves them at the same time to touch bodies which we see them turn and turn again before they take them between their teeth.

It is therefore to the sense of feeling that we are indebted for the power of usefully exercising all our other faculties. One man does not, perhaps, possess more ingenuity or capacity than another; but because in his earliest infancy he made a greater, and a readier use of this sense. As soon as children are indulged with the liberty of their hands, they presently bring them into action, and are fond of touching whatever is presented to them. They are seen to amuse themselves, and take a pleasure in handling every thing they are capable of grasping; they seem as if they were endeavouring to find out the form of bodies, by touching them on every side; and for a considerable time, they amuse themselves in this manner, or rather they inform themselves of new objects. In the rest of our life we ourselves if we reflect upon it, amuse ourselves in a different method than in doing, or in seeking to do any thing that is new.

C H A P. VI.

Of the apparent varieties in the human species—Laplanders—Tartars—Chinese—Japanese—Formosans—Moguls—Persians—Arabians—Circassians—Turks—Russians—Negroes—Hottentots—Americans—Causes of this variety.

THERE are many causes which contribute to the producing of an apparent variety between the different nations of the globe. Climate, food, manners and customs produce not only a difference in sentiment, but even in the external form of different people.

In examining the surface of the earth, and beginning our enquiries from the north, we find in Lapland, and in the northern parts of Tartary, a race of small-sized men, whose figure is uncouth, and whose physiognomy is as wild as their manners are unpolished. Though they seem to be of a degenerate species, they yet are numerous, and the countries they occupy are extensive.

The Laplanders, the Danes, the Swedes, the Muscovites, the inhabitants of Nova-Zembla, the Borandians, the Samoeids, the Ostiaks of the old continent, the Greenlanders, and the savages to the north of the Esquimaux Indians of the new continent, appear to be of one common race, which has been extended and multiplied along the coasts of the northern seas, and over deserts, considered as uninhabitable by every other nation. In these countries, the visage is large and broad, the nose is flat and short, the eyes are of a yellowish brown, inclining to black, the eyelids are drawn toward the temples, the cheek-bones are extremely prominent, the mouth is very big, the lower part of the countenance is very narrow, the lips are thick and turned outward, the voice is shrill, the head is bulky, the hair is black and straight, and the skin is tawny. They are small in stature, and, though meagre, they yet are of a squat form. In general, their size is about four feet, nor do the tallest exceed four feet and a half; and among these people, if there is any difference to be found, it depends on the greater or less degree of deformity.

The Danish Laplanders have a large black cat, which they make a confidant of all their secrets, and a counsellor in all their difficulties. Among the Swedish Laplanders,

landers, there is in every family a drum, for the purpose of consulting the devil; and though the natives of these countries are robust and nimble, from many circumstances there is reason to suppose, that they cannot live but in their own country, and in their own manner. In travelling over the ice and snow, they use skates made of fir, which are in length about two feet, and in breadth about half a foot, and which are raised and pointed before, and fastened to the foot by straps of leather. With these they make such dispatch, that they easily overtake the swiftest animals. They also use a pole, pointed with iron at one end, and rounded at the other. This pole serves to push them along, to direct their course, to keep them from falling, to stop the impetuosity of their career, and to kill what game they overtake. With their skates they descend the steepest mountains, and scale the most craggy precipices; nor are the women less skilful in such exercises than the men. They are all accustomed to the bow and arrow; and it is asserted, that the Muscovite Laplanders lance a javelin with so much dexterity, that at the distance of thirty paces, they are sure to hit a mark no larger than a silver crown, and with such force, that it will transfix a human body. As hunters, their favourite pursuit is that of the ermine, the fox, the lynx, and the martin; and of these animals, they barter the skins for their favourite articles of luxury, brandy and tobacco.

In winter the Laplanders clothe themselves with the skin of the rein-deer, and in summer with the skins of birds. To the uses of linen they are utter strangers. The women of Nova-Zembla have their nose and their ears pierced, in order to have them ornamented with pendants of blue stone; and also, as an additional lustre to their charms, they form blue streaks upon their forehead and chin. Those of Greenland dress themselves with the skin of the dog-fish: they also paint the visage with blue and yellow colours, and wear pendants in the ears. They all live under ground, or in huts almost entirely covered with earth, and with the bark of certain trees, or the skin of certain fishes; and some form subterranean trenches, by which one hut communicates with another, and by which, during the winter-months, they enjoy the conversation and society of their neighbours. A continued series of darkness for several months, obliges them to illuminate their dreary abode with lamps, which they keep alive with that very train-oil they use as drink. Under all

these hardships, they are subject to few diseases, and they live to a prodigious age. So vigorous indeed are the old men, that they are hardly to be distinguished from the young. The only infirmity they experience, and it is an infirmity common to them all, is that of blindness. Perpetually as they are dazzled by the strong reflection of the snow, in winter, and as they are enveloped in clouds of smoke in autumn and spring, rarely, when advanced in years, they are still found to retain the use of their eyes.

The Tartar country, taken in general, comprehends the greatest part of Asia, and in fact extends from Russia to Kamtschatka. In length it occupies from eleven to twelve hundred leagues, and in breadth from seven hundred to seven hundred and fifty, a circumference twenty times larger than that of the whole kingdom of France.

All the Tartar nations have the upper part of the visage very large and wrinkled, even while yet in their youth. Their nose is short and flat, their eyes are little, and sunk in the head; their cheek-bones are high; the lower part of their visage is narrow; their chin is long and prominent; their teeth are long and straggling; their eye-brows are so large as to cover the eyes; their eye-lids are thick; the face is broad and flat; their complexion is tawny; their hair is black. They have but little beard, have thick thighs, and short legs, and, though but of middling stature, they yet are remarkably strong and robust. The ugliest of them are the Calmoucks, in whose appearance there seems to be something frightful. They are all wanderers and vagabonds; and their only shelter is that of a tent made of hair or skins. Their food is horse-flesh and camel-flesh, either raw, or a little sodden between the horse and the saddle. They eat also fish dried in the sun. Their most common drink is mare's milk, fermented with millet ground into meal. They all have the head shaved, except a tuft of hair on the top, which they let grow sufficiently long to form into tresses on each side of the face. The women, who are as deformed as the men, wear their hair, which they bind up with bits of copper, and other ornaments of the same nature.

The majority of these tribes are alike strangers to religion, morality, and decency. They are robbers by profession; and the natives of Daghestan, who live in the neighbourhood of more polished countries, carry on a
great

great traffic of slaves, whom they carry off by force, and afterwards sell to the Turks and the Persians. Their wealth consists chiefly of horses, which are more numerous, perhaps, in Tartary, than in any other part of the world. They are taught, by custom, to live in the same place with their horses; they are continually employed in training and exercising them; and at length they reduce them to such implicit obedience, that they actually appear to understand, as it were, the intention of their rider.

Some travellers tell us, that the limbs of the Chinese are well-proportioned, that their body is large and fat, their visage is large and round, their eyes are small, their eye-brows are large, their eye-lids are turned upwards, their nose is short and flat; that, as for their beard, which is black, upon the chin there is very little, and upon each lip there are not more than seven or eight prickles; that those who inhabit the southern provinces of the empire, are more brown and tawny than the others; that, in colour, they resemble the natives of Mauritania, and the more swarthy Spaniards; but that those who inhabit the middle provinces, are as fair as the Germans.

Le Gentel assures us, that the Chinese women do every thing in their power to make their eyes appear little, and oblong; that, for this purpose, it is a constant practice with the little girls, from the instruction of the mother, forcibly to extend their eye-lids; and that, with the addition of a nose thoroughly compressed and flattened, of ears long, large, open, and pendant, they are accounted complete beauties. He adds, that their complexion is delicate, their lips are of a fine vermillion, their mouth is well-proportioned, their hair is very black; but that, by the use of paint, they so greatly injure their skin, that, before the age of thirty, they have all the appearance of old age.

So strongly do the Japanese resemble the Chinese, that we can hardly scruple to rank them in the same class. As being inhabitants of a more southern climate, they only differ from them in being more yellow, or more brown. In general, their stature is contracted, their face, as well as their nose, is broad and flat, their hair is black, and their beard is little more than perceptible. They are haughty, fond of war, full of dexterity and vigour, civil and obliging, smooth-tongued, and courteous, but fickle and vain. With astonishing patience, and even almost
regardless

regardless of them, do they sustain hunger, thirst, cold, heat, fatigue, and all the other hardships of life. Their ceremonies, or rather grimaces, in eating, are numerous and uncouth. They are laborious, are very skilful artificers, and, in a word, have nearly the same disposition, the same manners, and the same customs, as the Chinese.

One custom which they have in common, and which is not a little fantastic, is, so to contract the feet of the women, that they are hardly able to support themselves. Some travellers mention, that in China, when a girl has passed her third year, they break the foot in such a manner, that the toes are made to come under the sole; that they apply to it a strong water, which burns away the flesh; and, that they wrap it up in a number of bandages, till it has assumed a certain fold. They add, that the women feel the pain of this operation all their lives; that they walk with great difficulty; and that their gait is to the last degree ungraceful. Other travellers do not say that they break the foot in their infancy, but that they only compress it with so much violence as to prevent its growth; but they unanimously allow, that every woman of condition, and even every handsome woman, must have a foot small enough to enter, with ease, the slipper of a child of six years old.

Though the inhabitants of the kingdoms of Pegu and Aracan are blacker, yet they all bear a considerable resemblance to the Chinese. Those of Aracan place great value upon a forehead large and flat; and, in order to render it so, they apply a plate of lead to the forehead of their children, the minute they are born. Their nostrils are large, and extended; their eyes are small and lively; and their ears are of such length as to hang over their shoulders. They feed without disgust on mice, on rats, on serpents, and on fish, however corrupted. Their women are tolerably fair, and their ears are as long as those of the men. The people of Achan, who are situated farther to the north than those of Aracan, have also a flat visage, and an olive-coloured skin; and such is their unrefinement, that they allow their boys to go quite naked, and their girls with only a slight plate of silver over those parts which nature dictates to conceal.

Northward of the Philippine Islands is situated the island of Formosa, of which the natives, though situated at no great distance from the coast of Fokian in China, discover, however,

however, no resemblance to the Chinese. According to Struys, the Formosans are of small stature, those particularly who inhabit the mountains, and their visage is broad. The women have large and full breasts, and a beard like the men; their ears, naturally long, they render still more so by certain thick shells, which they wear as pendants; their hair is very black, and very long, and their complexion is of different degrees yellow. These islanders, though averse to labour, are yet admirably skilled in the use of the javelin, and bow; they are also excellent swimmers; and when they run, their swiftness is incredible.

The Moguls, and the other inhabitants of the peninsula of India, are not unlike the Europeans in shape and in features; but they differ more or less from them in colour. The Moguls are of an olive complexion; and yet, in the Indian language, the word *Mogul* signifies *White*. The women are extremely delicate, and they bathe themselves very often: they are of an olive colour, as well as the men; and, contrary to what is seen among the women of Europe, their legs and thighs are long, and their body is short. Tavernier says, that, after passing Lapor, and the kingdom of Cachemire, the women have naturally no hair on any part of the body, and the men have hardly any beard. According to Thevenot, the Mogul women are tolerably fruitful, though exceedingly chaste. They likewise suffer little from the pains of child-birth, and are often known to be up and abroad the day following. He adds, that in the kingdom of Decan, they are allowed to marry, the husband by his tenth, and the wife by her eighth year; and at that age they not unfrequently have children. The women who become mothers so soon, usually cease bearing, however, before they arrive at thirty; and by that period, they appear wrinkled, and marked with all the deformities of age.

The customs of the different nations of India are all very singular, if not whimsical. The Banians eat nothing which has had life in it; they are even afraid to kill the smallest reptile, however offensive to them; they throw rice and beans into their rivers as food for the fishes, and grain of different kinds upon the earth for the birds and insects. When they meet with a hunter, or a fisher, they beg of him instantly to desist from his employment; if deaf to their intreaties, they offer him money for his gun, or his nets; and when no persuasion, no offer, will
avail,

avail, they trouble the water, in order to frighten away the fishes, and cry with all their might, in order, in like manner, to put the birds and other game to flight.

In Ceylan there is a species of savages, who go by the name of *Bedas*, and who occupy a small district on the north part of the island. These *Bedas* seem to be totally different from all the nations around them. The spot they inhabit is entirely covered with wood, amidst which they keep themselves so closely concealed, that it is with great difficulty they are discovered. Their complexion is fair, and sometimes even red, like that of the Europeans. They do not speak the language of Ceylan; nor indeed has the language they do speak the smallest affinity to that of any of the other Indians. They have no villages, no houses, no intercourse with the rest of mankind. Their arms are, the bow and the arrow, with which they destroy a number of boars, stags, and other animals; and though they never dress their meat, they yet sweeten it with honey, which they possess in great abundance.

The inhabitants of Persia, of Turkey, of Arabia, of Egypt, and of the whole of Barbary, may be considered as one and the same people, who, in the time of Mahomet, and of his successors, invaded immense territories, extended their dominions, and became exceedingly intermixed with the original natives of all those countries. The Persians, the Turks, and the Moors, are to a certain degree civilised; but the Arabians have, for the most part, remained in a state of independence, which implies a contempt of laws. They live, like the Tartars, without order, without government, and almost without society: theft, robbery, and violence are authorised by their chiefs; they glory in their vices; to virtue they pay not the smallest respect; and of all human conventions, those only have they admitted, which owe their existence to fanaticism, and to superstition.

They are a people highly inured to labour; and to labour they take especial care to habituate also their horses. They allow this animal to eat or drink but once in twenty-four hours; and though their horses are necessarily meagre, they yet are excellent couriers, and seem, as it were, indefatigable.

The Egyptian women are very brown; their eyes are lively; their stature is rather low; their mode of dress is by no means agreeable; and their conversation is highly tiresome. But though the women of Egypt are com-
monly

monly rather short, yet the men are of a good height. Both, generally speaking, are of an olive colour; and the more we remove from Cairo, the more we find the people tawny, till we come to the confines of Nubia, where they are as black as the Nubians themselves.

The most inherent defects of the Egyptians are, idleness and cowardice. They do nothing almost the whole day but drink coffee, smoke, sleep, remain indolent in one place, or chatter in the streets. They are highly ignorant, and are full of the most ridiculous vanity. Though they cannot deny but that they have lost every thing noble they once possessed; the sciences, the exercise of arms, their history, and even their language; and that, from an illustrious and a valiant nation, they have become a people dastardly and enslaved; they, yet scruple not to despise all other nations, and to take offence at the bare offer of carrying their children into Europe, in order to give them a knowledge of the arts and sciences.

“The women of Circassia,” says Struys, “are exceedingly fair and beautiful. Their complexion is incomparably fine; their forehead is large and smooth; and, without the aid of art, their eye-brows are so delicate, that they appear as threads of silk. Their eyes are large, soft, and yet full of animation, their mouth is small and expressive of a smile, and their chin, what it ought to be in order to form a perfect oval. Their neck and breasts are admirably formed; their stature is tall, and the shape of their body easy; their skin, is white as snow, and their hair of the most beautiful black. They wear a little cap of a black stuff over which is fastened a roller of the same colour; but, what is truly ridiculous, is, that, instead of this roller, the widows wear the bladder of an ox, or a cow, inflated as much as possible, by which they disfigure themselves amazingly. In the summer-months, the inferior classes wear nothing but a shift, which is open down to the middle, and which is generally of a blue, yellow, or red colour. They are tolerably familiar with strangers, but at the same time faithful to their husbands, who are by no means inclined to be jealous of them.”

The Turks, who purchase a vast number of these women as slaves, are a people composed of many different nations. From the intermixture during the crusades of the Armenians, the Georgians, and the Turcomans, with the Arabians, the Egyptians, and even the Europeans,

it is hardly possible to distinguish the native inhabitants of Asia Minor, of Syria, and of the rest of Turkey. All we can observe is, that the Turkish men are generally robust, and tolerably well-made; that it is even rare to find among them persons either hump-backed or lame; that the women are also commonly beautiful, well-proportioned, and free from blemishes; that they are very fair, because they seldom stir from home; and that, when they do go abroad they are always veiled.

Before the Czar Peter I. we are told, the Muscovites had not emerged from barbarism. Born in slavery, they were ignorant, brutal, cruel, without courage, and without manners. Men and women bathed promiscuously in stoves heated to a degree intolerable to all persons but themselves; and on quitting this warm bath, they plunged, like the Laplanders, into cold water. Their food was homely; and their favourite dishes were cucumbers, or melons, of Astracan, which, in summer, they preserved in a mixture of water, flour, and salt. From ridiculous scruples they refrained from the use of several viands, amongst which were pigeons and veal. Yet, even at this period of unrefinement, the women were skilled in the arts of colouring the skin, of plucking out the eye-brows, and of painting artificial ones. They also adorned themselves with pearls and jewels, and their garments were made of rich and valuable stuffs. From these circumstances does it not appear, that the barbarism of the Muscovites was near a close, and that their sovereign had less trouble in polishing them than some authors have endeavoured to insinuate? They are now a people in some degree civilized and commercial, fond of spectacles, and of other ingenious novelties.

From the regions of Europe and Asia, our attention is now to be directed to a race of people differing more from ourselves in external appearances than any that has been hitherto mentioned.

In the seventeenth or eighteenth degree of north latitude, on the African coast, we find the negroes of Senegal and of Nubia, some in the neighbourhood of the ocean, and others of the red sea; and after them, all the other nations of Africa, from the latitude of eighteen North to that of eighteen south, are black, the Ethiopians, or Abyssinians excepted. It appears, then, that the portion of the globe which Nature has allotted to this race of men, contains an extent of ground, parallel to the equator, of about
nine

nine hundred leagues in breadth, and considerably more in length, especially northward of the equator. Beyond the latitude of eighteen or twenty, there are no longer any Negroes, as will appear when we come to speak of the Caffres, and of the Hottentots.

By confounding them with their neighbours the Nubians, we have been long in an error, with respect to the colour, and the features of the visage of the Ethiopians. Marmol says, that the Ethiopians are absolutely black, that their visage is large, and their nose flat; and in this description the Dutch travellers agree with him. The truth, however, is, that they differ from the Nubians, both in colour and in features. The skin of the Ethiopians is brown, or olive-coloured, like that of the southern Arabians, from whom, it is probable, they derive their origin. In stature they are tall; the features of their countenance are strongly marked; their eyes are large and beautiful; their nose is well proportioned; their lips are thin; and their teeth are white. Of the inhabitants of Nubia, on the contrary, the nose is flat, the lips are thick and prominent, and the countenance is exceedingly black. These Nubians, as well as the Barberins, their western neighbours, are a species of Negroes not unlike those of Senegal.

The Ethiopians are a people between the extremes of barbarism and of civilization. Their garments are of cotton, though those of the more opulent are of silk: their houses are low, and of a bad construction; their lands, too, are wretchedly neglected. These circumstances are owing to the behaviour of their nobles, who despise, mal-treat and plunder, as far as in them lies, the tradesmen and the common people. Each of these classes, however, lives separate from the other, and has its own villages or hamlets. Unprovided with salt at home, they purchase it from abroad for its weight in gold. So fond are they of raw meat, that, at their feasts, the second course, which they consider as the most delicate, consists of it entirely. Though they have vines, they yet have no wine; and their usual beverage is a sour composition made with tamarinds. They use horses for the purpose of travelling, and mules for that of carrying their merchandize. Of the arts or sciences they have little knowledge; their language is without rules; and their manner of writing, though their characters are more beautiful than those of the Arabians, is so imperfect, that, in order to finish an epistle, they require several days. In their mode of salutation there is something exceedingly whimsical.

whimsical. Each takes the right hand of the other, and carries it to his mouth; this done, the saluter takes off the scarf of the person saluted, and fastens it round his own body; so that the latter is left half naked, few of the Ethiopians wearing any thing more than this scarf, and a pair of cotton drawers.

The first Negroes we meet with, are those who live on the south side of Senegal. These people, as well as those who occupy the different territories between Senegal and Gambia, are called *Jalofes*. They are all very black, well-proportioned, and of a size sufficiently tall. The features of their visage are less harsh than those of the other Negroes; and some of them there are, especially among the female sex, of whom the features are far from being irregular. With respect to beauty, they have the same ideas as ourselves; of which, as essential ingredients, they consider fine eyes, a well-made nose and mouth, and lips of a proportional smallness. With respect to the ground of the picture alone, do they differ from us; for, with them, the colour must be exceedingly black and exceedingly glossy; their skin, however, is highly delicate, and soft; and, colour alone excepted, we find among them women as handsome as in any other country of the world. They are usually very gay, lively and amorous.

Father du Tertre says expressly, that, if the Negroes are for the most part flat-nosed, it is because the parents crush the noses of their children; that, in like manner, they compress their lips, in order to render them more thick; and that, of the few who have undergone neither of these operations, the features of the countenance are as comely, the nose is as prominent, and the lips are as delicate, as those of the Europeans. It appears however, that, among the Negroes in general, thick lips, and a nose broad and flat, are gifts from nature, by which was originally introduced, and at length established, their custom of flattening the nose and thickening the lips of such as, at their birth, discovered a deficiency in these ornaments.

Though the Negroes of Guinea are in general very healthy, yet they seldom attain what we term old age. In his own country, a Negroe at the age of fifty, is a very old man; and so early as at that of forty, he discovers all the marks of being so.

The Negroes in general are a remarkably innocent and inoffensive people. If properly fed, and unexposed to bad usage, they are contented, joyous and obliging; and on their very countenance

countenance may we read the satisfaction of their soul. If hardly dealt with, on the other hand, their spirits forsake them, and they droop with sorrow. Alike impressed with a sense of what injuries, and of what favours they have received, to a cruel master they are implacable foes; to an indulgent one, servants who will exert every effort of which human nature is capable, in order to express to him their zeal, and their attachment. To their children, their friends, their countrymen, they are naturally compassionate and tender; cheerfully, of the little they have, do they communicate a share to those who are in necessity or in indigence, though, otherwise than from that necessity, that indigence, they have not, perhaps, the smallest knowledge of them. That they have an excellent heart, therefore, is evident; and, in having this, they have the seed of every virtue. Their sufferings demand a tear. Are they not already sufficiently unhappy in being reduced to a state of slavery; in being obliged always to work without ever reaping the smallest fruits of their labour? To crown their wretchedness, must they be abused, buffeted, treated like brutes? Humanity revolts at the idea of a conduct, which nothing but the thirst of gold could ever have introduced, and of which, from that thirst, every day will still, perhaps, produce an aggravated repetition, till an enlightened legislature shall put an end to a traffic which disgraces human nature.

Mr. Kolbe, though he has given so minute a description of the Hottentots, is strongly of opinion, however, that they are Negroes. Like that of the latter, he assures us, their hair is short, black, frizzled and woolly; nor in a single instance did he ever observe it long.

Though of all the Hottentots the nose is very flat, and very broad, yet it would not be of that form, did not their mothers, considering a prominent nose as a deformity, think it a duty incumbent upon them to crush it presently after their birth. Their lips are also thick, and their upper lip is especially so; their teeth are very white; their eye-brows are thick; their head is large; their body is meagre; their limbs are slender. They seldom live longer than forty years; and of this short duration of life, the causes, doubtless, are, their being so fond of filth, and residing continually in the midst of it, as also their living upon meat that is tainted or corrupted, of which indeed their nourishment chiefly consists. I might dwell longer upon the description of this nasty people; but as most travellers have
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already given very large accounts of them, to their writings I refer. One fact, however, related by Tavernier, I ought not to pass in silence. The Dutch, he says, once took a Hottentot girl, soon after her birth; and, after bringing her up among themselves, she became as white as an European. From this circumstance he presumes, that all the Hottentots would be of a tolerable whiteness, were it not for their custom of perpetually begriming themselves.

Though in America we observe less variety in the human form than might be expected in so extremely extensive a continent, it cannot yet be supposed, but that in such a diversity of climates and situations, a considerable diversity of inhabitants must also be found.

In beginning our enquiries, then, we find in the most northern parts of America a species of Laplanders, similar to those of Europe, or to the Samoeids of Asia; and though, in comparison of the latter, they are few in number, yet they are diffused over a very considerable extent of ground. Those who inhabit the lands of Davis's Strait, are of a diminutive size, of an olive complexion, and their legs are short and thick. They are skilful fishers; they eat their fish and their meat raw; their drink consists of pure water, or of the blood of the dog-fish; they are, moreover, very strong, and generally live to a great age. Here, we see, are the figure, the colour, and the manners of the Laplanders; and, what is truly singular is, that, as among the Laplanders of Europe, we meet with the Finlanders, who are white, comely, tolerably tall, and tolerably well made; so, in like manner, among the Laplanders of America we meet with another species of men, tall, well made, tolerably white, and with features exceedingly regular.

Of a different race from the former seem to be the savages of Hudson's Bay, and northward of the land of Labrador: they are ugly, however, diminutive, and unshapely; their visage is almost entirely covered with hair, like the savages of the country of Yeco, northward of Japan. In summer they dwell under tents made of skins of the rein-deer; in winter they live under ground, like the Laplanders and the Samoeids, and, like them, sleep together promiscuously, and without the smallest distinction. They likewise live to a great age, though they feed on nothing but raw meat and fish. The savages of Newfoundland have a considerable resemblance to those of Davis's Strait; they are low in stature; they have little or no beard; their visage is broad and flat; their eyes are large; they are generally rather flat-

nosed;

nosed; and, upon the whole, are far from being unlike the savages of the north continent, and of the environs of Greenland.

Besides these savages, who are scattered over the most northern parts of America, we find others more numerous, and altogether different, in Canada, and in the vast extent of land to the Assiniboils. These are all tolerably tall, robust, vigorous, and well made; they have hair and eyes black, teeth very white, a complexion tawny, beard scanty, and over the whole of their body hardly a vestige of hair; they are hardy, indefatigable walkers, and very nimble runners. They are alike unaffected by excesses of hunger, and of repletion; they are by nature bold and fierce, grave and sedate. So strongly, indeed, do they resemble the Oriental Tartars in the colour of the skin, the hair, and the eyes, in the scantiness of beard, and of hair, as also in disposition, and in manners, that, were they not separated from each other by an immense sea, we should conclude them to be descended from that nation. In point of latitude, their situation is also the same; and this still farther proves, how powerfully the climate influences not only the colour, but the figure of men.

Mr. Fabry, who travelled a prodigious way to the north-west of the Mississippi, and visited places which no European had visited before him, and of which, consequently, the savage inhabitants had not been destroyed, has assured me, that that part of America is so deserted, that he often travelled an hundred, and two hundred leagues, without observing a single human face, or the smallest vestige of an habitation; that, whenever he did meet with any habitations, they were always at immense distances from one another; that, in each of them, there was frequently no more than one family; sometimes there were two or three families, but never above twenty persons together; and that, between these twenty persons and twenty others, there was generally a space of a hundred leagues at least.

To dwell long on the customs of such savage nations, would, in my opinion, be unnecessary. It has not been always attended to by authors, that what they have given us for established customs, and for the manners of a community, were nothing more than actions peculiar to a few individuals, and often determined by circumstances, or by caprice. Some nations, they tell us, eat their enemies, some burn them, and some mutilate them; one nation is perpetually at war; and of another, the grand object is to

live in peace ; in one country, the child kills his parent, when he has lived to a certain age ; and in another, the parent eats his child. All these stories, on which travellers have with so much complacency enlarged, mean nothing more than that one savage had devoured his enemy, another had burned or mutilated him, and a third had killed or eaten his child. All these things may be known to happen in one, as well as in several savage nations ; for every nation in which there is no government, no law, no master, no habitual society, ought rather to be termed a tumultuous assemblage of men, barbarous and independent ; men who obey nothing but their own private passions, and who, incapable of having a common interest, are also incapable of pursuing one object, and of submitting to fixed and settled usages ; these supposing a series of designs, founded on reason, and approved of by the majority.

If, however, in the whole of North America, there were none but savages to be met with, in Mexico, and in Peru, there were found nations polished, subjected to laws, governed by kings, industrious, acquainted with the arts, and not destitute of religion.

In the present state of these countries, so intermixed are the inhabitants of Mexico and New Spain, that hardly do we meet with two visages of the same colour. In the town of Mexico, there are white men from Europe, Indians from the north, and from the south of America, and negroes from Africa, &c. insomuch, that the colour of the people exhibits every different shade which can subsist between black and white. The real natives of the country are very brown, and of an olive colour, well made, and active ; and though they have little hair, even upon the eye-brows, yet upon their head, their hair is very long, and very black.

In surveying the different appearances which the human form assumes in the different regions of the earth, the most striking circumstance is that of colour. This circumstance has been attributed to various causes ; but I think experience fully justifies us in affirming, that of this the principal cause is the heat of the climate. When this heat is excessive, as at Senegal and in Guinea, the inhabitants are entirely black ; when it is rather less violent, as on the eastern coasts of Africa, they are of a shade more light ; when it begins to be somewhat more temperate, as in Barbary, in India, in Arabia, &c. they are only brown ; and, in fine, when it is altogether temperate, as in Europe and in Asia, they are white ; and the varieties which are there
remarked,

remarked, proceed solely from those in the mode of living. All the Tartars, for example, are tawny, while the Europeans, who live in the same latitude, are white. Of this difference the reasons seem to be, that the former are always exposed to the air; that they have no towns, no fixed habitations; that they sleep upon the earth, and in every respect live coarsely and savagely. These circumstances alone are sufficient to render them less white than the Europeans, to whom nothing is wanting which may render life comfortable and agreeable. Why are the Chinese more white than the Tartars, whom they resemble in all the features of the visage? It is because they live in towns, because they are civilized, because they are provided with every expedient for defending themselves from the injuries of the weather, to which the Tartars are perpetually exposed.

When cold becomes extreme, however, it produces some effects similar to those of excessive heat. The Samoeids the Laplanders, the Greenlanders, are very tawny; and it is even asserted, as we have already observed, that, among the Greenlanders, there are men as black as those of Africa. Here we see the two extremes meet; violent cold, and violent heat, produce the same effect upon the skin, because these two causes act by one quality, which they possess in common. Dryness is this quality; and as it is a quality of which intense cold is equally productive as intense heat, so by the former, as well as by the latter, the skin may be dried up, altered, and rendered as tawny as what we find it among the Laplanders. Cold compresses, shrivels, and reduces within a narrow compass, all the productions of nature; and thus it is, that we find the Laplanders, who are perpetually exposed to all the rigours of the most piercing cold, the most diminutive of the human species.

The most temperate climate is between the degrees of forty and fifty. There we behold the human form in its greatest perfection; and there we ought to form our ideas of the real and natural colour of man. Situated under this zone, the civilized countries are, Georgia, Circassia, the Ukraine, European Turkey, Hungary, South Germany, Italy, Switzerland, France, and the North of Spain; of all which the inhabitants are the most beautiful, and the most shapely, in the world.

As the first, and almost the sole, cause of the colour of mankind, we ought therefore to consider the climate; and though upon the skin the effects of nourishment are trifling, when compared with those of the air and soil, yet upon the

form they are prodigious. Food which is gross, unwholesome, or badly prepared, has a strong and a natural tendency to produce a degeneracy in the human species; and in all countries where the people fare wretchedly, they also look wretchedly, and are more ugly, and more deformed than their neighbours. Even among ourselves, the inhabitants of country places are more ugly than the inhabitants of towns; and I have often remarked, that, in one village, where poverty and distress were less prevalent than in another village of the vicinity, the people of the former were, at the same time, in person more shapely, and in visage less ugly.

The air and the soil have also great influence, not only on the form of men, but on that of animals, and of vegetables. Let us, after examining the peasants who live on hilly grounds, and those who live imbosomed in the neighbouring valleys, compare them together, and we shall find, that the former are active, nimble, well shaped, and lively; the women commonly handsome; that, on the contrary, the latter, in proportion as the air, food and water are gross, the inhabitants are clumsy, and less active and vigorous.

From every circumstance, therefore, we may obtain a proof, that mankind are not composed of species essentially different from each other; that, on the contrary, there was originally but one individual species of men, which, after being multiplied and diffused over the whole surface of the earth, underwent divers changes, from the influence of the climate, from the difference of food, and of the mode of living, from epidemical distempers, as also from the intermixture, varied *ad infinitum*, of individuals more or less resembling each other; that, at first, these alterations were less considerable, and confined to individuals; that, afterwards, from the continued action of the above causes becoming more general, more sensible, and more fixed, they formed varieties in the species; that these varieties have been, and are still, perpetuated from generation to generation, in the same manner as certain deformities, and certain maladies, pass from parents to their children; and that, in fine, as they would never have been produced but by a concurrence of external and accidental causes, as they would never have been confirmed and rendered permanent but by time, and by the continued action of these causes, so it is highly probable, that in time they would in like manner gradually disappear, or even become different from what they at present are, if such causes were no longer to subsist, or if they were in any material point to vary.

C H A P. VII.

*Of domestic animals—the Horse—the Ass—the Ox—the Sheep
—the Goat—of the Swine—the Wild Boar, &c.*

THE HORSE. **T**HE noblest conquest ever made by man, is that of this spirited and haughty animal, which shares with him the fatigues of war, and the glory of the combat. Equally intrepid as his master, the horse sees the danger, and braves it; inspired at the clash of arms, he loves it, he seeks it, and is animated with the same ardour. He feels pleasure also in the chase, in tournaments, in the course; he is all fire, but equally tractable as courageous, does not give way to his impetuosity, and knows how to check his inclinations: he not only submits to the arm which guides him, but even seems to consult the desires of his rider; and, always obedient to the impressions which he receives from him, presses on, moves gently, or stops, and only acts as his rider pleases. The horse is a creature which renounces his being, to exist only by the will of another, which he even knows how to anticipate, and even express, and execute by the promptitude and exactness of his movements: he feels as much as we desire, does only what we wish, giving himself up without reserve, and refuses nothing, makes use of all his strength, exerts himself beyond it, and even dies the better to obey us.

Such is the horse, whose natural qualities art has improved, which from the earliest ages has been taken care of and afterwards exercised, and broken to the service of man; his education commences with the loss of his liberty, and by constraint it is finished. The slavery or servitude of these creatures is universal, and so ancient that we rarely see them in their natural state: they are never wholly free from all their bands, not even at the time of rest; and if they are sometimes suffered to range at liberty in the fields, they always bear about them marks of servitude, and frequently the cruel marks of labour and of pain: the mouth is deformed by the wrinkles occasioned by the bit, the flanks scarred with wounds, inflicted by the spur, the hoofs are pierced by nails, the attitude of the body constrained, from the subsisting impression of habitual shackles, from which they would be delivered in vain, as they would

not be the more at liberty for it. Even those whose slavery is the most gentle, who are only fed and broken for luxury and magnificence, and whose golden chains serve less to decorate them, than to satisfy the vanity of their master, are still more dishonoured by the elegance of their trappings, by the tresses of their manes, by the gold and silk with which they are covered, than by the iron shoes on their feet.

Nature is more beautiful than art, and in an animated being, the freedom of its movements makes nature beautiful: observe the horses in Spanish America, which live wild; their gait, their running, or their leaping, seem neither constrained nor regular. Proud of their independence, they fly the presence of man, and disdain his care; they seek and find for themselves proper nourishment; they wander about in liberty, in immense meads, where they feed on the fresh productions of an eternal spring: destitute of any fixed habitation, without any other shelter than a mild sky, they breathe a purer air than those which are confined in vaulted palaces. These wild horses are also much stronger, much swifter, and more nervous than the greater part of domestic horses; they have, what nature has bestowed upon them, strength and nobleness; the others, only what art can give, beauty and cunning.

The natural disposition of these animals is not ferocious, they are only high-spirited and wild; and though superior in strength to the greatest part of animals, they yet never attack them; and if they are attacked by others, either disdain them or trample them under their feet. They go also in bodies, and unite themselves into troops, merely for the pleasure of being together, for they are not fearful of, but have an attachment to each other. As herbs and vegetables are sufficient for their nourishment, they have quite enough to satisfy their appetite; and as they have no relish for the flesh of animals, they never make war with them, nor with themselves; they never quarrel about their food, they have no occasion to ravish the prey of another, the ordinary source of contentions and quarrels among carnivorous animals. They live in peace because their appetite is simple and moderate; and, as they have enough, there is no room for envy.

As all parts of Europe are at present peopled, and almost equally inhabited, wild horses are no longer found there; and those which we see in America, were originally European tame horses, which have multiplied in

the vast deserts of that country. The astonishment and fear which the inhabitants of Mexico and Peru expressed at the sight of horses and their riders, convinced the Spaniards that this animal was intirely unknown in these countries; they therefore carried thither a great number as well for service, and their particular utility, as to propagate the breed. M. de la Salle, in 1685, saw in the northern parts of America, near the Bay of St. Louis, whole troops of these wild horses feeding in the pastures, which were so fierce that no one dared to approach them. The author of the History of the Adventures of the Buccaneers, says, that in the island of St. Domingo, horses may sometimes be seen in troops of upwards of five hundred, all running together, and that as soon as they see a man, they will all stop; that one of them will approach to a certain distance, snort, take flight, and then all the rest will follow him. To catch them, they make use of nooses made of ropes, which they spread and hang in places which they know they frequent: but if they are caught by the neck they strangle themselves, unless the hunter comes time enough to their assistance, who instantly secures them by the body and legs, and fastens them to trees, where they are left for two days without either food or drink. This experiment is sufficient to begin to make them tractable, and in time they become as much so as if they had never been wild; and even, if by chance they ever regain their liberty, they never become so again, but know their masters, and suffer them to catch them again without trouble.

The manners of these animals almost wholly depend on their education. From time immemorial it has been the custom to separate the colts from their mothers: mares are suffered to suckle them five, six, or seven months; for experience has taught us, that those colts which are suckled ten or eleven months, are not of equal value with those which are weaned sooner, though they are generally fuller of flesh. After six or seven months sucking, they are weaned, that they may take more solid nourishment than milk; bran is then given them twice a day, and a little hay, of which the quantity is increased in proportion as they advance in age, and they are kept in the stable as long as they seem to retain any desire to return to the mare; but when this desire ceases, they are suffered to go out in fine weather, and led to pasture; but care must be taken not to suffer them to go out to pasture fasting; they
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must have bran, and be made to drink an hour before they are suffered to graze, and are never to be exposed to great cold or rain: in this manner they spend the first winter: in the May following, they are not only permitted to graze every day, but are suffered to lie in the fields all the summer, and even to the end of October, only observing not to let them eat the after-grass; for if they accustom themselves much to it, they will grow disgusted with hay, which ought however to be their principal food, during the second winter, together with bran mixed with barley, or oats wetted. They are managed in this manner, letting them graze in the day time during winter, and in the night also during the summer, till they are four years old, when they are taken from the pastures, and fed on hay. This change in his food requires some precaution; for the first eight days, the colt should have nothing but straw, and it is proper to administer some vermifuge drinks, as those insects may have been generated from indigestion, and green food.

Great attention must be paid in weaning young colts, to put them into a proper stable, not too hot, for fear of making them too delicate and sensible to the impressions of the air. They should frequently have fresh litter and be kept very clean, by frequently rubbing them down with a whisp of straw. But they should not be tied up or curried till they are two years and a half, or three years old, this currying gives them great pain, their skin being as yet too delicate to bear it, and they would fall away instead of growing fat from it; care must also be taken that the rack and manger are not too high, the necessity of raising their heads too high in order to reach their food, may possibly give a habit of carrying it in this fashion, which would give them an aukward appearance.

At the age of three years, or three years and a half, the rider should begin to break them and make them tractable; they should at first have a light easy saddle, and ought to wear it two or three hours every day, and they should be accustomed to have a snaffle bit in their mouths, and to lift up their feet, on which they should sometimes receive rather smart strokes, and if designed for coach or draught horses, should wear harness and a bridle. At first a curb should not be used, they should be held by a cavesson or leather strap, and be made to trot, on even ground, without a rider, and with only the saddle or harness on the body; and when the saddle horse turns easily,

easily, and willingly follows the person who holds the leather strap, the rough rider should mount him and dismount again in the same place, without making him move, till he is four years old, because, before that age, the weight of a man overloads him, but at four years he should be made to walk or trot, a little way at a time, with the rider on his back. When a coach horse is accustomed to the harness, he should be paired with a horse that is thoroughly broke, putting on him a bridle, with a strap passed through it, till he begins to be used to the draught; after this the coachman must teach him to back, having the assistance of a man before, who must push him gently back, and even give him some blows to make him do it: all this should be done before young horses have changed their food, for when once they are what is called corn-fed, that is, when they feed on grain and hay, as they are more vigorous, it is remarked also that they are less tractable, and more difficult to break.

The bit and the spur are two means made use of to bring them into order. The mouth does not appear formed by nature to receive any other impressions than that of taste and appetite, there is, however, so great a sensibility in the mouth of a horse, that in preference to the eyes and ears, we address ourselves to it, to make him understand our pleasure; the smallest motions or pressure of the bit, is sufficient to inform and determine the animal; and this organ of sense has no other fault than its perfection. Its too great sensibility must be managed, for if it is abused, the mouth of the horse is spoiled, and rendered insensible to the impression of the bit; the senses of sight, and hearing are not subject to such a change, and could not be dulled in this manner; but, it has been found inconvenient to govern horses by these organs, and it is generally true, that signs given them by the sense of feeling have more effect on animals in general than those conveyed by the eyes or ears; besides, the situation of horses with relation to those who mount or conduct them, makes their eyes almost useless for this purpose, because they see only straight forwards, so that they could only perceive the signs made to them when they turned their heads round; and although they are frequently conducted and animated by the ear, yet in fact, if they are well broken, the smallest pressure of the thighs, or most trifling motion of the bit, is sufficient to direct them; the spur is even useless, or at least it is only made use of to force them to violent motions; and

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as through the folly of the rider, it often happens that in giving the spur, he checks the bridle, the horse finding himself excited on one side, and kept in on the other, only prances and capers without stirring out of his place.

By means of the bridle we learn horses to hold up their heads, and place them in a proper manner, and the smallest sign or movement of the rider is sufficient to make the horse shew all his different paces; the most natural is perhaps the trot, but pacing and galloping are more pleasant for the rider, and these are the two paces we particularly endeavour to improve.

Though walking is the slowest of all their paces, an horse should, notwithstanding, step quick, and neither take too long or too short steps; his carriage should be easy, this ease depends much on the liberty of his shoulders, and is known by the manner in which he carries his head in walking; if he keeps it high and steady, he is generally vigorous, quick, and free in his motions. When the motion of the shoulders is not free, the leg does not rise enough, and the horse is apt to stumble, and strike his foot against the inequalities on the ground; and when the shoulders are still more confined in their action, and the motion of the legs appears free, the horse is soon fatigued, stumbles, and becomes useless. A horse should raise his shoulders, and his lower haunches in walking; he should also support his leg, and raise it high enough, but if he keeps it up too long, or lets it fall too slowly, he loses all the advantage of his suppleness, becomes heavy, and fit for nothing but to match with another, and for shew.

It is not sufficient that his walk should be easy, his steps must be also equal and uniform both behind and before, for if his buttocks have a swinging motion whilst he keeps up his shoulders, the rider is much jolted, which is very uneasy to him: the same thing happens when the horse extends his hind leg too much, and rests it almost in the same place in which he rested his fore foot. Horses with short bodies are subject to this fault; those which cross their legs or strike them against each other, are not sure footed; and those whose bodies are long, are the most easy for the rider, because he is at a greater distance from the two centers of motion, the shoulders and haunches, and is therefore less sensible of the motion and jolting.

The usual method of walking among quadrupedes, is to lift up at the same time one of the fore legs and one of the

the hind legs; whilst the right fore leg is in motion, the left hind leg follows and advances at the same time, and this step being made, the left fore leg conjointly with the right hind leg in its turn, and so on. As their bodies are supported upon four points of support, which form a long square, the easiest manner of moving for them, is to change two of them at once in a diagonal line, in such a manner, that the centre of gravity of the body of the animal may move but little, and rest always in the direction of the two points which are not in motion; in the three natural paces of the horse, the walk, the trot, and the gallop, this rule of motion is always observed, but with some difference. In the walk, there are four times in the movement; if the right fore leg moves first, the left hind leg follows the moment after, then the left fore leg moves forward in turn, to be followed the instant after by the right hind leg; thus the right fore foot rests on the ground first, the left hind foot next, then the left fore foot rests, and lastly, the right hind foot, which makes a movement of four times, and at three intervals, of which, the first and last are shorter than the middle one. In the trot there are but two times in the movement; if the right fore leg goes off first, the left hind leg moves at the same time, and without any interval between the motion of the one, and the motion of the other; also the left fore leg moves at the same time with the right hind one.

In the gallop there is usually three times; but as in this movement there is a kind of leaping, the interior parts of the horse do not move of themselves, but are driven away by the strength of the haunches and the hinder parts: thus, of the two fore legs, the right ought to advance more forward than the left; the left ought before hand to rest on the ground to serve as a point of rest for the sudden jirk which he takes: thus it is the left hind foot that makes the first time of the movement, and which rests on the ground first; then the right hind leg is lifted up conjointly with the left fore leg, and rest on the ground together: at length, the right fore leg, which is raised an instant after the left fore leg, and right hind one, rests on the ground last, which makes the third time: thus, in this movement of the gallop, there are three times and two intervals; and in the first of these intervals, when the movement is made with haste, there is an instant when the four legs are in the air at the same time, and when the four shoes of the horse may be seen at once. When the horse

horse has the haunches and the houghs supple, and moves them with quickness and agility, the movement of the gallop is more perfect, and the cadence is made in four times: he then rests the left hind foot which shews the first time; then the right hind foot falls to the ground and shews the second time; the left fore foot falls a moment after, shewing the third time; and at length the right fore foot, which rests last, shews the fourth time.

Horses usually gallop on the right foot, in the same manner as they carry the fore right leg in walking and trotting; they also throw up the dirt in galloping with the right fore leg, which is more advanced than the left; and also the right hind leg which follows immediately the right fore one, is more advanced than the left hind leg, and that the whole time that the horse continues to gallop: whence it results, that the left leg which supports all the weight, and which forces forwards the others, is more tired; for this reason it would be right to exercise horses in galloping alternately on the left foot, as well as on the right; and they would consequently bear much longer this violent motion.

In walking, the legs of the horse are lifted up only a small height, and the feet almost scrape the ground; in trotting they are raised higher, and the feet are entirely free from the ground; in galloping the legs are lifted up still higher, and the feet seem to rebound from the earth. The walk to be good should be quick, easy, light, and sure; the trot should be firm, quick, and equally sustained; the hind foot ought to follow well the fore foot: the horse in this pace should carry his head high, and his back straight; for, if the haunches rise and fall alternately at each trot he takes, if the crupper moves up and down, and the horse rocks himself, he trots ill through weakness; if he throws out wildly his fore legs, it is another fault: the fore legs should tread in a line with the hind ones, which should always efface their tracks. When one of the hind legs is thrown forwards, if the fore leg of the same side remain in its place too long, the motion becomes more uneasy and difficult from this resistance; and it is for this reason that the interval between the two times of the trot should be short; but, be it ever so short, this resistance is sufficient to make this pace more uneasy than walking and galloping, because in walking the motion is more easy, gentle, and the resistance less; and in galloping there is scarcely any horizontal resistance, which is the only one inconvenient for the rider.

Walking,

Walking, trotting, and galloping, are the most usual natural paces; but some horses have another natural pace, called the amble, which is very different from the three others, and, at the first glance of the eye, appears contrary to the laws of mechanics, and extremely fatiguing to the animal, though the quickness of motion is not so great as in galloping, or trotting hard. In this pace the foot of the horse grazes the ground still more than in walking, and each step is much longer. But the most remarkable circumstance is, that the two legs on the same side, set off at the same time to make a step, and afterwards the two other legs move at the same time to make another, so that each side of the body alternately is without support, and there is no equilibrium maintained between the one or the other; it is therefore only from his almost grazing the earth, and the quick alternate motion, that he can support himself in this pace. There is in the amble, as well as in the trot, but two times in the motion; and all the difference is, that in the trot the two legs which go together are opposite, in a diagonal line: instead of which, in the amble, the two legs on the same side go together: this pace, is very easy for the rider, as it has not the jolting of the trot, which is occasioned from the resistance the fore leg meets with when the hind leg rises; because, in the amble, the fore leg rises at the same time with the hind leg on the same side: instead of which, in trotting the fore leg on the same side, rests and assists the impulse during the whole time that the hind leg is in motion.

The horse, of all animals, is that which, with great stature, has the greatest proportion and elegance in every part of the body; and compared with every other animal he appears superior in these respects. The great length of the jaws, is the principal cause of the difference between the heads of quadrupedes, and of the human species; it is also, the most ignoble mark of all; yet, though the jaws of the horse are very long, he has not, like the ass, an air of imbecility, or of stupidity like the ox. The regularity of the proportions of his head, on the contrary, gives him an air of sprightliness, which is well supported by the beauty of his chest. The horse seems desirous of raising himself above his state of a quadruped, by holding up his head, and in this noble attitude he looks man in the face; his eyes are lively and large, his ears well made, and of a just proportion, without being short like those of the bull, or too long like those of the ass; his mane suits well
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his head, ornaments his neck, and gives him an air of strength and haughtiness; his long bushy tail covers, and terminates advantageously the extremities of his body, far different from the short tails of the stag, the elephant, &c. and the naked tails of the ass, the camel, the rhinoceros, &c. The tail of the horse is formed of long, thick hair, which seems to come from the rump, because the stump from which it grows is very short; he cannot raise his tail like the lion, but it suits him better hanging down, as he can move it sideways; it is very useful to him to drive away the flies which incommode him, for though his skin is very hard, and is every where furnished with a close thick coat, it is, notwithstanding, extremely sensible.

The head of a well proportioned horse should be lean and small, without being too long; the ears at a moderate distance, small, straight, immoveable, narrow, thin, and well-placed on the top of the head; the forehead narrow, and a little convex; the hollows filled up, the eye-lids thin, the eyes clear, lively, full of fire, rather large, and projecting from the head, the pupil large, the nether jaw thin, the nose a little aquiline, the nostrils large and open, the partition of the nose, and the lips thin, the mouth of a moderate width, the withers raised and sloping, the shoulders thin, flat, and not confined, the back equal, even, and insensibly arched lengthways, and raised on each side of the spine, which should appear indented; the flanks full and short, the rump round and fleshy, the haunches well covered with hair, the stump of the tail thick and firm, the fore-legs and thighs thick and fleshy, the knee round before, the houghs large and rounded, the sinew loose, the joint next the foot small, the fetlock not thickly covered with hair, the pastern large, and of a middling length, the coronet rather raised, the hoof black, smooth, shining, and high, the quarters round, the heels wide and moderately raised, the frog small and thin, and the sole thick and hollow.

But there are few horses in which this assemblage of perfection is to be found: the eyes are subject to many complaints, which are sometimes difficult to be known. In a healthy eye, we ought to see through the cornea two or three spots of the colour of soot, above the pupil: to see these spots, the cornea must be clear, clean, and transparent; if it appears double, or of a bad colour, the eye is not good: a small, long, and straight pupil, encompassed with a white circle, is also a bad sign; and when it

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is of a blueish-green colour, the eye is certainly bad, and the sight dull.

I shall at present only add some remarks, by which, as well as by the preceding, a judgment may be formed of the principal perfections or imperfections of an horse. It is very easy to judge of the natural and actual state of the animal by the motion of his ears; when he walks, he should project forwards the points of his ears; a jaded horse carries his ears low; those which are spirited and mischievous, alternately carry one of their ears forwards and one backwards: they all carry their ears on that side from which they hear any noise, and when any one strikes them on the back, or on the rump, they turn their ears back. Horses which have the eyes deep sunk in the head, or one smaller than the other, have usually a bad sight; those which have the mouth dry, are not of so healthy a temperament as those which have the mouth moist, and make the bridle frothy. A saddle horse ought to have the shoulders flat, moveable, and not very fleshy; the draft horse, on the contrary, should have them flat, round, and brawny: if, notwithstanding, the shoulders of a saddle horse are too thin, and the bones shew themselves through the skin, it is a defect which shews the shoulders are not free, and consequently the horse cannot bear fatigue. Another fault of a saddle horse is, to have the chest project too forward, and the fore legs drawn too much back, because he is apt to rest on the hand in galloping, and even to stumble and fall: the length of the legs should be proportionable to the height of the horse; when the fore legs are too long he is not sure footed, if they are too short, he is too heavy in the hand: it is a remark that mares are more liable than horses to be short-legged, and that horses in general have the legs thicker than mares or geldings.

One of the most important things to be known, is the age of the horse: it is from the teeth that we obtain the most certain knowledge of their age; the horse has forty; twenty-four grinders, four eye teeth, and twelve incisive teeth; mares have no eye teeth, or if they have them they are very short: the grinders are not instrumental to the knowledge of their age, we form our judgment from the front and eye teeth. The twelve front teeth begin to shew themselves fifteen days after the birth of the foal, these first teeth are round, short, not strong, and drop out at different times in order to make room for others: at two years and a half the four front middle teeth drop out the

first, two at top and two at bottom; a year after four others fall out, one on each side of those which are already replaced; at about four years and a half, four others drop out, always on the side of those which have been replaced, these four last milk teeth are replaced by four others, which do not grow near so fast as those which replaced the first eight; and these four last teeth which are called the wedges, and which replace the four last milk teeth, are those by which we know the age of an horse; these are easily known, since they are the third as well at top as at bottom, beginning to count from the middle of the extremity of the jaw; these teeth are hollow and have a black mark in their concavity; at four years and a half, or five years old, they scarcely project beyond the gums, and the hollow is plainly seen; at six years and a half it begins to fill up, the mark also begins to diminish and grow narrower, and so continues till seven years and a half or eight years, when the hollow is entirely filled up and the black mark effaced: after the animal has attained eight years, as these teeth do not give further information of the age, we generally judge by the eye teeth or tusks; these four teeth are placed at the side of those which I have just now been speaking of; the eye teeth, as well as the grinders, are not preceded by others which fall out, those of the inferior jaw usually come out first at three years and a half, and the two of the upper jaw at four years, and till they are six years old they are very sharp; at ten years old the upper ones appear already blunt, worn and long, because they are bare, the gum wearing away with age, and the more they are worn away the more aged the horse is: from ten till thirteen or fourteen years, there is hardly any indication of the age, but then some hairs on the eye-brows begin to grow white; but this indication is equivocal, since it has been remarked that horses engendered from old stallions and old mares have the hair white on the eye brows at ten years old. There are also horses whose teeth are so hard that they do not wear, and upon which the black mark subsists, and is never effaced; and others which have the mark in the mouth as long as they live. We may also know, though with less precision, the age of a horse by the ridges of the palate, which are effaced in proportion to his age.

It has been remarked, that studs situated in dry and light countries produce good-tempered, swift, and vigorous horses, with nervous legs and hard hoofs; while on the
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other hand, those which are bred in damp places, and in fat pasturage, have generally the head large and heavy, the legs thick, the hoofs soft, and the feet flat. This difference arises from the climate and food, which may be easily understood; but, what is more difficult to be comprehended, and what is still more essential than any thing that has been said, is, the necessity of always crossing or mixing the breed, if we would prevent their degenerating.

Mares, usually go with foal eleven months and some days; they will breed commonly to the age of fourteen or fifteen years, and the more vigorous longer than eighteen years.

The duration of the life of horses, is like that of every other species of animals, in proportion to the length of the time of their growth. Man, who is above fourteen years in growing, lives six or seven times as long, that is to say, ninety or a hundred years. The horse, who attains his full growth in four years, lives six or seven times as long, that is to say, twenty-five or thirty years. There are so few examples to contradict this rule, that we should not even regard them as exceptions from which we may draw any precedents; and as robust horses are at their entire growth in less time than delicate ones, they also live less time, and at fifteen years of age are old.

The Arabian horses are the handsomest known in Europe, they are larger and plumper than those of Barbary, and equally well-shaped, but as they are not often brought into this country, riding-masters are not able to give an exact account of their perfections and defects.

The horses of Barbary are more common; they are frequently negligent in their paces, and must be often reminded: they are very swift and strong, very light, and very fit for hunting. These horses seem the most proper to breed from; it were only to be wished that they were of larger stature, as they seldom exceed four feet eight inches high.

The Turkish horses are not so well-proportioned as those of Barbary: they will, however, travel a great way, and are long winded: this is not surprising, if we do but consider, that in warm countries, the bones of animals are harder than in cold climates; and it is for this reason, that they have more strength in the legs.

The Spanish horses, hold the second rank after those of Barbary; those of a handsome breed are plump, well-coated, and low of stature; they also use much motion in their

carriage, and have great suppleness, spirit and pride; their hair is usually black, or of a bay chefnut colour, though there are some of all colours, and it is but seldom that they have white legs and noses. The Spaniards, who have an aversion to these marks, never breed from horses that have them, chusing only a star in the forehead.

The handsomest English horses have in their conformation great resemblance to those of Arabia and Barbary, from which, in fact, they are bred; they are frequently five feet high, and above; they are of all colours, and have all kinds of marks; they are generally strong, vigorous, bold, capable of great fatigue, and excellent for hunting and coursing.

The horses of Italy were formerly much handsomer than they are at present, because the breed for some time has been neglected, notwithstanding there are still some handsome Neapolitan horses, especially draught-horses; but, in general, they have the head large, and the chest thick; they are untractable, and, consequently, not easily managed; these defects are compensated by their noble form, their stateliness, and the beauty of their motions.

The Danish horses are so handsome in their form, and so beautiful in their coats, that they are preferred to all others for putting into carriages; they are of all colours, and even of some singular ones, as pied; and horses spotted like tigers are found no where but in Denmark.

In Germany we meet with very handsome horses; but they are generally heavy and short-breathed. The Hussars and Hungarians split their nostrils, with a view, they say, of giving them more breath, and also to hinder their neighing in battle. The Flemish horses are greatly inferior to those of Holland: they have almost all large heads, flat feet, and are subject to humours in the eyes; and these two last are essential defects in coach-horses.

According to Marmol, the Arabian horses are descended from the wild horses of the deserts of Arabia, of which, in ancient times, large studs were formed, which have multiplied so much, that all Asia and Africa are full of them: they are so nimble, that some will outstrip the very ostriches in their course. The Arabians of the desert, and the people of Lybia, breed a great number of these horses for hunting, but neither use them in travelling nor in their wars; they send them to pasture whilst there is grass for them; and when that fails, they feed them only with dates and camel's milk, which make them nervous, nimble and lean. They lay

lay snares for the wild horses, and eat the flesh of the young ones, which they affirm is very delicate food. These wild horses are smaller than the tame ones, and are commonly ash-coloured, though there are also some white ones, and the mane and the hair of the tail is short and frizzled.

Let an Arabian be ever so poor, he has horses; they usually mount the mares, experience having taught them that they bear fatigue, hunger, and thirst, better than horses; they are also less vicious. They use them so much to be together, that they will remain so in great numbers for days together, left to themselves, without doing the least harm to each other. The Turks, on the contrary, do not approve of mares; and the Arabians sell them the horses which they do not keep for stallions. They have long preserved, with great care, the breed of their horses; they know their generations, alliances, and all their genealogy, and distinguish the breeds by different names. The lowest price for a mare of the first class, is from one hundred, to two or three hundred pounds sterling. As the Arabians have only a tent for their house, this tent serves them also for a stable. The mare, colt, husband, wife and children, lie promiscuously together; and the little children will lie on the body and neck of the mare and colt, without these animals incommoding or doing them the least injury. These mares are so accustomed to live in this familiarity, that they will suffer any kind of play. The Arabians treat them kindly, talk and reason with them, and take great care of them, always let them walk, and never use the spur without necessity; whence, as soon as they feel their flank tickled with the stirrup-iron, they set out immediately with incredible swiftness, and leap hedges and ditches, with as much agility as so many does; and if their rider happens to fall, they are so well broken, that they will stop short even in the most rapid gallop. All Arabian horses are of a middling size, very easy in their manner, and rather thin than fat; they are dressed morning and evening regularly, with so much care, that not the smallest spot is left on their skins; and their legs, mane and tail, are also washed, which are let grow long, and seldom combed, to avoid breaking the hairs. They have nothing given them to eat all day, and seldom are allowed to drink above two or three times; at sunset, a bag is fastened round their heads, in which is about half a bushel of very clean barley. These horses, therefore, eat only during the night; and the bag is not taken from them till the next morning, when all is

eaten up; and, in the month of March, when the grass is tolerably high, they are turned out to pasture. As soon as the spring is past, they are taken again from pasture, and have neither grass or oats all the rest of the year, and straw but seldom, barley being their only food. They do not fail cutting the mane of the colts as soon as they are a year or eighteen months old, in order to make it grow thick and long. They mount them at two years old, or two years and a half at farthest; till this age they put neither saddle nor bridle on them; and every day, from morning till night, all the Arabian horses stand saddled at the door of the tent.

The breed of these horses is dispersed in Barbary, among the Moors, and even among the Negroes of the river Gambia and Senegal; the lords of the country have some which are of uncommon beauty. Instead of barley or oats, they give them maize reduced to flour, which they mix with milk, when they are inclined to fatten them; and in this hot climate they seldom let them drink.

The Tartars live with their horses nearly in the same manner as the Arabians do. When they are about seven or eight months old, the young children mount them, and make them walk and gallop a little way by turns; they thus break them by degrees, and oblige them to undergo long fastings; but they never mount them for racing or hunting till they are six or seven years old, and then make them support incredible fatigue, such as travelling two or three days together without stopping, passing four or five without any other food than a handful of grass every eight hours, and also inure them to go twenty-four without drinking. These horses, which appear, and which are in reality, so robust in their own country, become enfeebled and are soon good for nothing, when transported to China or the Indies; but they succeed better in Persia and Turkey. In lesser Tartary they have also a breed of small horses, which are in such estimation, that they are not allowed to sell them to foreigners. These horses have all the good and bad qualities of those of great Tartary, which shews how much the same manners, and the same education, give the same disposition to these animals. There are also in Circassia, and in Mingrelia, many horses which are even handsomer than those of Tartary; there are also found some handsome horses in the Ukraine, Walachia, Poland and Sweden; but we have no particular account of their qualities and defects.

When the horse is impassioned with love, desire, or appetite, he shews his teeth, and seems to laugh; he shews them also when he is angry, and would bite; he sometimes puts out his tongue to lick, but less frequently than the ox, who licks much more than the horse, and who, notwithstanding, is less sensible to caresses.

The horse also remembers ill treatment much longer, and is sooner rebuffed than the ox; his natural spirit and courage are such, that, when he finds more is expected from him than he is able to perform, he grows angry, and will not endeavour; instead of which, the ox, who is slow and idle, exerts himself, and is more easily tired.

The horse sleeps much less than man; for when he is in health, he does not rest more than two or three hours together; he then gets up to eat; and when he has been too much fatigued, he lies down a second time, after having eaten; but, in the whole, he does not sleep more than three or four hours in the twenty-four. There are even some horses who never lie down, but sleep standing. It has also been remarked, that geldings sleep oftener and longer than horses.

Quadrupeds do not all drink in the same manner, though they are all equally obliged to seek with the head for the liquor, which they cannot get any other way, excepting the monkey, macaw, and some others that have hands, and consequently drink like men, when a vase or glass is given them which they can hold; for they carry it to their mouths, inclining the head, throwing down the liquor, and swallowing it by the simple motion of deglutition. Man usually drinks in the same manner, because it is most convenient. Most quadrupeds also choose that mode which is most agreeable to them, and constantly follow it. The dog, whose mouth is very large, and the tongue long and thin, drinks lapping; that is, by licking the liquor, and forming with the tongue a kind of cup or scoop, which fills each time with a tolerable quantity of liquor; and this mode he prefers to that of wetting the nose. The horse, on the contrary, whose mouth is small, and whose tongue is too short and thick to scoop it up, and who always drinks with more avidity than he eats, dips the mouth and nose quickly and deeply into the water, which he swallows largely by the simple motion of deglutition; but even this forces him to drink without fetching his breath; whilst the dog breathes at his ease while he is drinking. Horses therefore should be suffered to take several draughts, especially

after running, when respiration is short and quick; they should not be suffered to drink the water too cold, because that, independently of the cholic, which cold water frequently occasions, it sometimes happens also, from the necessity they are in of dipping the nose into the water, that they catch cold, which often lays the foundation of a disorder called the glanders, the most formidable of all to that species of animal; for it is known, that the seat of the glanders is in the pituitary membrane, and that it is consequently a real cold, which causes an inflammation in this membrane; and travellers, who give us a detail of the maladies of horses in warm climates, as in Arabia, Persia, and Barbary, do not say that the glanders are so frequent there as in cold climates; and it is from this that the conjecture arises, that this malady is occasioned by the coldness of the water, because these animals are obliged to dip and keep the nose and nostrils a considerable time under water, which would be prevented by never giving it to them cold, and by always wiping the nostrils after they have drank. Asses, who fear the cold more than horses, and who resemble them so strongly in the interior structure, are, notwithstanding, not so subject to the glanders; which may possibly happen from their drinking in a different manner from horses; for, instead of dipping the mouth and nose deeply into the water, they scarcely touch it with their lips.

I shall not speak of the other diseases of horses; it would extend this Natural History too much to join to the history of an animal that of its disorders: nevertheless, I cannot leave the history of the horse, without regretting that the health of this useful animal should have been hitherto abandoned to the care, and too frequently absurd practice, of ignorant people. The branch of physic which the ancients called Veterinarian, is at present scarcely known but by name. Were some physician to direct his views this way, and make this study his principal object, he would soon find it answer his purpose, both with respect to reputation and profit. Instead of degrading himself, he would render his name illustrious; and this branch of physic would not be so conjectural and difficult as the other. All causes being more simple in animals than in man, the diseases ought also to be less complicated, and consequently more easily to be guessed at, and treated with more success, without mentioning the entire liberty he would have of making experiments and finding out new remedies, and the

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ability of arriving without fear or reproach at a great extent of knowledge of this kind, from which, by analogy, might also be drawn inferences useful to the art of curing mankind.

THE ASS.] If we consider this animal with attention, he appears only to be a horse degenerated. The perfect similitude in the conformation of the brain, the lungs, the stomach, the intestinal conduit, the heart, the liver, and other viscera, and the great resemblance of the body, legs, feet, and the entire skeleton, is a sufficient foundation for this opinion; we may also attribute these slight differences which are found between these two animals, to the influence of the climate, food, and the fortuitous succession of many generations of small wild horses, half degenerated, which, by little and little, have still continued degenerating, and have been degraded as much as possible, and have at last produced a new and fixed species; or rather, a succession of individuals alike, all vitiated in the same manner, sufficiently differing from a horse, to be looked upon as another species. What appears to favour this notion is, that as horses vary much more than asses in the colour of their skin, they are consequently more anciently domestic, since all domestic animals vary much more in their colour than wild ones of the same species; that the greater number of wild horses, of which travellers speak, are small in their size, and have, like asses, the coat grey, and the tail naked and frizzled at the end; and, that there are wild horses, and even domestic ones, which have a black stripe on the back, and other marks, which nearly resemble both wild and domestic asses.

Again, if we consider the difference of the temperament, disposition and manners; in a word, the organism of these two animals, and, above all, the impossibility of mixing the breed to make one common species, or even an intermediate species which may be renewed, it appears a better-founded opinion, to think that these animals are of a species equally ancient, and originally as essentially different as they are at present; as the ass differs materially from the horse, in the smallness of the size, largeness of the head, length of the ears, hardness of the skin, nakedness of the tail, the form of the rump, and also in the dimensions of the neighbouring parts; such as the voice, the appetite, manner of drinking, &c. Do the horse and the ass, then, come originally from the same stock? are they of the same family, or not? and have they not always been different animals?

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When two individuals cannot produce together, we can no otherwise account for it, but from slight difference in their temperament, or some accidental fault in the organs of generation, of one or the other of these two individuals; that two individuals of different species, and which are joined together, should produce other individuals which do not resemble the one or the other in any fixed particular, and can consequently produce nothing like themselves, there needs for that but a certain degree of conformity between the form of the body and the organs of generation of these different animals; but what an immense, and perhaps infinite number of combinations are necessary, even to suppose that two animals, male and female, of a certain species, have not only so much degenerated, as to be no longer of the same species; that is to say, are no longer able to produce with those of their own kind, but are even degenerated to such a degree that they can only produce together; and also, what a prodigious immensity of combinations are necessary that the production of these two degenerated animals should follow exactly the same laws which are observed in the production of perfect animals; for a degenerated animal is itself a vitiated production; and how can a vitiated, depraved origin, become a stock, and not only produce a constant succession of beings, but even produce them in the same manner, and following the same laws, which in effect reproduce the animal, the origin of which is pure?

Although we cannot demonstrate that the production of a species, by degeneration, is a thing impossible in nature, yet the number of probabilities to the contrary is so great, that even philosophically, we can no longer doubt of it; for if some species have been produced by the degeneration of others, if the species of the ass comes from the species of the horse, this can only have happened successively; and by degrees there would have been, between the horse and the ass, a great number of intermediate animals, the first of which would have differed but slightly in its nature from the horse, and the latter would have approached by degrees to that of the ass: and why do we not see the representatives, the descendants of these intermediate species? why do only the two extremes remain?

The ass is then an ass, and not a horse degenerated; the ass has a naked tail; he is neither a stranger, an intruder, nor a bastard; he has, like all other animals, his family, his species, and his rank; his blood is pure; and although his nobility is less illustrious, yet it is equally good, equally

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ancient with that of the horse. Why, then, have we so much contempt for this animal; so good, so patient, so steady, so useful? do men carry their contempt even to animals, those which serve them so well, and at so small an expence? we bestow education on the horse, take care of him, instruct him, and exercise him, whilst the ass is abandoned to the care of the lowest servant, or the tricks of children; so that, instead of improving, he must lose by his education; and if there were not a fund of good qualities, he would certainly lose them by the manner in which he is treated. He is the may-game of the rusticks, who beat him with staves, overload him, and make him work beyond his strength. We do not consider, that the ass would be in himself, and with respect to us, the most beautiful, the best-formed, and most distinguished of animals, if there were no horse in the world; he is the second, instead of being the first; and it is from that only, that he appears to be of no value: the comparison degrades him; we look at him, and give our opinions, not from himself, but comparatively with the horse; we forget that he is an ass, that he has all the qualities of his nature, all the gifts attached to his species; and at the same time, we only think of the figure and qualities of the horse, which are wanting in him, and which he ought not to have.

He is naturally as humble, patient, and quiet, as the horse is proud, ardent, and impetuous; he suffers with constancy, and perhaps with courage, chastisement and blows; he is moderate both as to the quantity and quality of his food; he is contented with the hardest and most disagreeable herbs, which the horse, and other animals, will leave with disdain; he is very delicate with respect to his water, for he will drink none but the clearest, and from rivulets which he is acquainted with; he drinks as moderately as he eats, and does not put his nose in the water (through fear, as some say, of the shadow of his ears): as care is not taken to curry-comb him, he frequently rolls himself on the grass, thistles, and in the dust; and, without regarding his load, he lays himself down to roll about as often as he can, and by this seems to reproach his master, for the little care he takes of him; for he does not paddle about in the mud and in the water; he even fears to wet his feet, and will turn out of his road to avoid the mud; his legs are also drier and cleaner than the horse; he is susceptible of education, and some have been seen sufficiently disciplined to be made a shew of.

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In their earliest youth, they are sprightly, and even handsome; they are light and genteel; but, either from age or bad treatment, they soon lose it, and become slow, indocile and headstrong. Pliny assures us, that, when they separate the mother from the young one, she will go through fire to recover it. The ass is also strongly attached to his master, notwithstanding he is usually ill-treated; he will smell him afar off, and can distinguish him from all other men; he also knows the places where he has lived, and the ways which he has frequented; his eyes are good, and smell acute; his ears are excellent, which has also contributed to his being numbered among timid animals, which it is pretended have all the hearing extremely delicate, and the ears long; when he is overloaded, he shews it by lowering his head, and bending down his ears; when he is greatly abused, he opens his mouth, and draws back his lips in a most disagreeable manner, which gives him an air of derision and scorn; if his eyes are covered over, he remains motionless; and when he is laid down on his side, and his head is fixed in such a manner that one eye rests on the ground, and that the other is covered with a piece of wood or stick, he will remain in this situation without any motion or endeavour to get up: he walks, trots, and gallops like the horse; but all his motions are smaller, and much slower; notwithstanding he can run with tolerable swiftness, he can gallop but a little way, and only for a small space of time; and whatever paces he uses, if he is hard pressed, he is soon fatigued.

The horse neighs, and the ass brays, which he does by a long, disagreeable and discordant cry. The she-ass has the voice clearer and shriller; those that are gelded, bray very low; and, though they seem to make the same efforts, and the same motions of the throat, yet their cry cannot be heard far off.

Of all the animals covered with hair, the ass is least subject to vermin; he has never any lice, which apparently proceeds from the hardness and dryness of the skin, which is certainly harder than in the greatest part of other quadrupeds; and it is for the same reason, that he is much less sensible than the horse, to the whip and the sting of the flies.

At two years and a half old, the first middle incisive teeth fall out, and afterwards the other incisive at the side of the first fall also, and are renewed at the same time and in the same order as those of the horse; the age of the ass is also known

known by his teeth; the third incisive on each side ascertains it, as in the horse.

The ass is three or four years in growing, and lives twenty-five or thirty years. They sleep less than the horse, and do not lie down to sleep, except when quite tired.

There are among asses different races, as among horses; but they are much less known, because they have not been taken the same care of, or followed with the same attention; but we cannot doubt that they came all originally from warm climates. Aristotle assures us, that there were none in his time in Scythia, nor in the other neighbouring countries of Scythia, nor even in Gaul, which, he says, is a cold climate; and he adds, that a cold climate either prevents them from procreating their species, or causes them to degenerate; and that this last circumstance is the reason that they are small and weak in Illyria, Thrace and Epirus. They appear to have come originally from Arabia, and to have passed from Arabia into Egypt, from Egypt into Greece, from Greece into Italy, from Italy into France, and afterwards into Germany, England, and lastly into Sweden, &c. for they are, in fact, weak and small in proportion to the coldness of the climate.

The Latins, after the Greeks, have called the wild ass, angra; which animal must not be confounded, as some naturalists and many travellers have done, with the zebra; of which we shall give a separate history, because the zebra is of a different species from the ass. The angra, or wild ass, is not striped like the zebra, and is not near so elegant in figure. Wild asses are found in some of the islands of the Archipelago, and particularly in that of Cerigo; there are also many in the deserts of Lybia and Numidia; they are grey, and run so fast, that the horses of Barbary only can beat them in hunting. When they see a man, they give a loud cry, turn themselves about, and stop, and do not attempt to fly till they find he comes near them; they are taken in snares made with ropes, and go in troops both to pasturage and to drink; their flesh is also eaten. There were also, in the time of Marmol, wild asses in the island of Sardinia, but less than those of Africa; and Pietro della Valle said, he has seen a wild ass at Bassora, whose figure differed in no respect from a domestic one; he was only of a lighter colour, and had, from the head to the tail, a stripe of white; he was also much livelier, and lighter in hunting, than asses usually are.

Neither

Neither asses nor horses have been found in America, although the climate, but especially of that part called North America, is as good for them as any other; those which the Spaniards have transported from Europe, and which they have left in the West-Indies, and on the Continent, have greatly multiplied; and in some parts wild asses are found in troops, and are taken in snares like wild horses.

The ass with the mare produces large mules, and the horse with the she-ass produces small mules, differing from the first in many respects; we shall finish the natural history of the ass with that of its properties, and the uses to which the animal may be applied.

As wild asses are unknown in these climates, we cannot in reality say whether the flesh is good to eat; but it is certain, that the flesh of the domestic ass is extremely bad, and harder than that of the horse. The milk of the ass, on the contrary, is an approved and specific remedy for certain complaints, and its use is known from the Greeks to us: that it may be good in its kind, we should chuse a young healthy she-ass, full of flesh, that has lately foaled, and which has not since been with the male: care must be taken to feed her well with hay, wheat, and grafs, with particular care not to let the milk cool, and not even to expose it to the air, which will spoil it in a little time.

The skin of the ass is used for different purposes, such as to make drums, shoes, &c. and thick parchment for pocket-books, which is slightly varnished over: it is also with asses skin that the Orientals make the sagri, which we call shagreen.

The ass is, perhaps, with respect to himself, the animal which can carry the greatest weight; and as it costs but little to feed him, and he scarcely requires any care, he is of great use in the country, at the mill, &c. he also serves to ride on, as all his paces are gentle, and he stumbles less than the horse: he is frequently put to the plough in countries where the earth is light, and his dung is an excellent manure to enrich hard moist lands.

THE Ox.] After man, those animals which live on flesh only, are the greatest destroyers: they are at the same time both the enemies of nature, and the rivals of man. It is only by an attention always new, and by cares premeditated and followed, that these flocks, these birds, &c.

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can be sheltered from the fury of the birds of prey, and the carnivorous wolf, fox, weazel, &c. and it is only by a continual war, that he can preserve his grain, fruits, all his subsistence, and even his clothing, against the voracity of the rats, moths, mites, &c. Insects are among those creatures, which do more harm than good in the world; on the contrary, the ox, the sheep, and those other animals which feed on grass, are the best, the most useful, and the most precious for man; since they not only nourish him, but consume and cost him least: the ox, above all the rest, is the most excellent in this respect, for he gives as much to the earth as he takes from it, and even enriches the ground on which he lives; instead of which the horse and the greatest part of other animals, in a few years impoverish the best pasture-land.

That the ox is not so proper as the horse, the ass, the camel, &c. for carrying burthens, the form of his back and loins, is a demonstration; but the thickness of his neck, and the broadness of his shoulders sufficiently indicate that he is proper for drawing, and carrying the yoke; it is also, in this manner that he draws with the most advantage, and it is singular that this custom is not general.

Throughout some provinces they oblige him to draw with his horns, for which the only reason they give is, that when harness is fixed to his horns, he is managed with more ease: his head is very strong, and he draws very well in this manner, but with much less advantage than when he draws by the shoulders. He seems to be made on purpose for the plough; the size of his body, the slowness of his motions, the shortness of his legs, and even his tranquillity and patience when he labours, seem to concur in rendering him proper for the cultivation of the fields, and more capable than any other of overcoming the constant resistance that the earth opposes to his efforts.

In those species of animals, which man has formed into flocks, and where the multiplication is the principal object, the female is more necessary, more useful than the male; the produce of the cow is a benefit which grows, and which is renewed every instant, the flesh of the calf is healthy and delicate; the milk is the food of children, butter relishes the greatest part of our victuals, and cheese is the common food of the country-people; how many poor families are, at this time, reduced to live on their cow! These same men who every day, and from morning

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to night, groan with anguish, exhausted with continual labour, gain nothing from the earth but black bread, and are obliged to give to others the flour, the substance of their grain; it is through them, and not for them, that the harvests are abundant; these same men who breed and multiply cattle, who take care of and are constantly occupied with them, dare not enjoy the fruits of their labour, the flesh of the beasts they are forbidden to eat, reduced as they are by the necessity of their condition, that is to say, by the brutality of other men, to live like horses, on barley and oats, or on common herbs, and four milk.

At eighteen months old, the cow is arrived at puberty, and the bull when he arrives at two years; but though they can engender at this age, it is better to stay till they are three years old before they are suffered to copulate: the strength of these animals is greatest from three years old till nine; after this, neither cows nor bulls are fit for any thing but to fatten for the slaughter, as at two years of age they are almost at their full growth: the length of their lives is also, like that of the greatest part of the other species of animals, about fourteen years, and they seldom live longer than fifteen.

The dullest and most idle animals are not those which sleep the soundest, or the longest. The ox sleeps, but his sleep is short, and not very sound; for he awakes at the least noise: he usually lies on his left side, and that kidney is always larger and fatter than the kidney on the right side.

Oxen, like other domestic animals, differ in colour; but at the same time red appears the most common colour, and the redder they are, the more they are esteemed. It is said, that oxen of a bay colour last longest; that those of a brown colour are sooner fatigued, and shorter lived; that the grey, brindled, and white are not proper for work, and are only fit to be fatted for slaughter: but whatever colour the coat of the ox is of, it should be shining, thick, and soft to the touch; for if it is rough and uneven, we have reason to think that the animal is not well, or at least, that he is not of a strong constitution.

The ox should only be worked from three years old to ten; and it is proper to take him then from the plough, in order to fatten and sell him, as the flesh will be better than if he be kept longer. The age of this animal is known

known by his teeth and horns. The first front teeth fall out when he is ten months old, and are replaced by others which are larger and not so white: at sixteen months those on each side of the middle teeth drop out, and are replaced by others; and at three years old, all the incisive teeth are renewed: they are then all long, white, and even; and, in proportion as the ox advances in years, they decay, and become unequal and black. The horns fall off at three years, and these are replaced by other horns, which, like the second teeth, fall off no more; only those of the ox and the cow grow larger and longer than those of the bull; the growth of these second horns is not uniform. The first year, that is to say, the fourth year of the age of the ox, two little pointed horns sprout, which are even, and terminate at the head by a kind of knob; the following year this knob grows from the head, pushed out by a cylinder of horn, which forms and terminates also by another knob, and so on; for as long as the animal lives, the horns grow: these knobs become annular knots, which are easily to be distinguished in the horns, and by which also the age may be easily known, by reckoning three years for the first knob next the point of the horn, and one year more for each of the intervals between the other knobs.

The horse eats night and day, slowly, but almost continually; the ox, on the contrary, eats quick, and takes in a short time all the food which he requires; after which he ceases eating, and lies down to ruminate. This difference arises from the different conformation of the stomachs of these animals. The ox, of whose stomachs the two first form but one bag of a vast capacity, can in both of them, without inconvenience, at the same time receive grass, which it afterwards ruminates and digests at leisure. The horse, whose stomach is small, and can receive but a small quantity of grass, is filled successively in proportion as he digests it, and it passes into the intestines, where is performed the principal decomposition of the food.

Chewing the cud is but a vomiting without straining, occasioned by the re-action of the first stomach on the food which it contains. The ox fills the two first stomachs, the paunch, and the bag, which is but a portion of the paunch, as much as he can. This membrane acts with force on the grass which it contains; it is chewed but a little, and its quantity is greatly increased by

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fermentation. Were the food liquid, this force of contraction would occasion it to pass by the third stomach, which only communicates with the other by a narrow conveyance, and cannot admit such dry food, or, at least, can only admit the moister parts. The food must, therefore, necessarily pass up again into the œsophagus, the orifice of which is larger than the orifice of the conduit, and the animal again chews and macerates them, imbibes them afresh with its saliva, and thus by degrees makes the aliment more moist; he reduces it to a paste, liquid enough for it to go into this conduit which passes into the third stomach, where it is again macerated before it goes into the fourth; and it is in this last stomach that the decomposition of the hay is finished, which is reduced to a perfect mucilage.

What chiefly confirms the truth of this explication, is, that as long as the animals suck, and are fed with milk and other liquid aliments, they do not chew the cud; and that they chew the cud much more in winter, when they are fed with dry food, than in summer, when they eat tender grass.

Good milk is neither too thick, nor too thin; its consistence should be such, that when we take a drop, it should preserve its roundness without running, and in colour it should be of a beautiful white: that which is inclinable to blue or yellow is not good; its taste should be sweet, without any bitterness or sourness; it should also be of a good colour, or without colour; it is best during the month of May, and during the summer, than in the winter; and it is never perfectly good but when the cow is of a proper age, and in good health. The milk of young heifers is too thick, that of old cows during the winter is also too thick. The milk of cows which are hot, is not good, any more than that of a cow which is near her time, or which has lately calved. In the third and fourth stomach of the calf which sucks, there are clots of curdled milk; these clots of milk dried in the air, serve to make rennet, and the longer it is kept, the better it is, and it requires but a small quantity to make a large quantity of cheese.

Bulls, cows, and oxen, are very apt to lick themselves, but mostly when they are quiet and at rest; and as it is thought that it prevents their fattening, it is usual to rub all the parts of their bodies which they can touch with their dung. When this precaution is not taken, they

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raise up the hair of their coats with their tongues, which are very rough, and they swallow this hair in large quantities. As this substance cannot digest, it remains in the stomach, and forms round, smooth balls, which are sometimes of so considerable a size, that they incommode them, and prevent their digestion, by remaining in the stomach. These knobs in time get covered with a brown crust, which is somewhat hard; it is, notwithstanding, but a thick mucilage, which, by rubbing and co-action becomes hard and shining; it is never found any where but in the paunch, and if any of the hair gets into the other stomachs, it does not remain any more than in the bowels, but seems to pass with the aliments.

Animals which have incisive teeth, such as the horse and the ass, in both jaws, bite short grass more easily than those which want incisive teeth in the superior jaw; and if the sheep and the goat bite the closest, it is because they are small, and their lips are thin. But the ox, whose lips are thick, can only bite long grass; and it is for this reason that they do no harm to the pasture on which they live, as they can only bite off the tops of the young grass: they do not stir the roots, and for this reason scarcely hurt the growth; instead of which, the sheep and the goat bite so close, that they destroy the stalk and spoil the root. Besides, the horse chooses the most delicate grass, and leaves the largest to grow, the stalks of which are hard: instead of this, the ox bites these thick stalks, and by little and little destroys the coarse grass; so that, at the end of some years, the field in which the horse has lived becomes a very bad one, whilst that on which the ox has browsed, becomes fine pasture.

THE SHEEP.] We can no longer doubt, but that animals which are actually domestic, were formerly wild: those whose history has already been given, afford a sufficient proof of it; and there are still wild horses, wild asses, and wild bulls. But man, who has conquered so many millions of individuals, can he boast of having conquered an entire species? As they were all created without his participation, may he not also believe, that they all have had orders to grow without his help? If we consider, nevertheless, the weakness and stupidity of the sheep, and at the same time reflect, that this animal, without defence, cannot find safety in flight; that he has for his enemies

all devouring animals, which seem to seek him in preference to any other, and to devour him by choice; that formerly this species produced but few; that each individual lived but a short time; we shall be tempted to think, that from the beginning, sheep were confided to the care of man; that they had occasion for his protection to subsist, and of his care to multiply; since it is a fact, that there are no wild sheep in the deserts; that in all places where man does not rule, the lion, the tiger, and the wolf reign by force, and by cruelty; that these animals of blood and carnage, all live longer, and multiply much more than sheep; and, in short, that if we were now to abandon the troops of these species, which we have rendered so numerous, they would soon be destroyed before our eyes, and the species would be entirely annihilated by the voraciousness of its numberless species of enemies.

The sheep is indeed absolutely without resource, and without defence. The ram has but feeble arms; his courage is nothing but a petulance useless to himself, inconvenient to others, and which is destroyed by castration. The wether sheep are still more fearful than ewes; it is through fear that they gather so often in troops; the smallest noise, to which they are unaccustomed, is sufficient to make them fly, and get close together. This fear is attended with the greatest stupidity; for they know not how to fly the danger, nor do they even seem to feel the inconvenience of their situation; they continue wherever they are, either in rain or snow, whence they will not stir; and to oblige them to change their situation, they must have a chief, who is intrusted to walk first, and whom they will follow, step by step. This chief will remain with the rest of the flock, without motion, in the same place, if he were not driven from it by the shepherd, or the dog which guards them, who, in fact, watches for their safety, defends, directs, and separates them, assembles them together, and communicates to them motions not their own. Goats, which in many things resemble sheep, have much more understanding.

But this animal, so cowardly in itself, so wanting in sentiment, and interior qualities, is to man the most precious of all animals, and the most useful, both for his present, and future support. Of itself, it not only supplies our greatest necessities, but, at the same time fur-

nishes us both with food and clothing: without reckoning the particular advantages we have from the milk; the skin, and, even the bowels, the bones, and the dung of this animal seem to evince that nature has given it nothing but what turns out useful to man.

These animals, whose understandings are so simple, are also of a very weak constitution; for they cannot walk long; travelling weakens and exhausts them; and when they run, they pant, and are soon out of breath. The great heat of the sun is as disagreeable to them, as too much moisture, cold and snow. They are subject to many disorders, the greatest part of which are contagious; superabundance of fat sometimes kills them, and always prevents them from having young ones. They suffer a great deal in having young, have frequent abortions, and require more care than any other domestic animal.

At one year old, the sheep lose the two front teeth of the inferior jaw; and almost every one knows that they have no incisive teeth in the superior jaw; at eighteen months old, the two neighbouring teeth of the two first that fell, fall also; and, at three years old, they are all replaced; they are then even, and tolerably white; but, in proportion as the animal becomes older, they become uneven and black. The age of the ram is also known by his horns, which shew themselves in the first year, and frequently from the birth; they grow every year a ring, which is a mark round, and continue growing till death. Most commonly, the sheep have no horns; but they have boney prominences on their heads, in the same part where the horns of the rams grow; there are, notwithstanding, some sheep which have two, and even four horns. These sheep are like the others; their horns are five or six inches long, but less turned than those of the ram; and when there are four horns, the two exterior ones are shorter than the two others.

Sheep carry their young five months, and drop them at the beginning of the sixth; they usually produce but one lamb, and sometimes two; in warm climates they may produce twice a year, but in cold climates they produce but once a year.

The sheep has great plenty of milk for five or six months. This milk is tolerable food for children, and for poor people in the country; and they make good cheese with it, especially when it is mixed with cow's milk.

In dry soils, and in high grounds, where wild thyme and other odoriferous herbs abound, the flesh of the sheep is of a much better quality than when it is fed in low plains and humid valleys, unless these plains are sandy and near the sea; because then all the herbs imbibe a saltiness, and the flesh of mutton is no where so good as in these salt meadows; the sheep's milk is also more abundant, and of a better flavour, as nothing is more pleasing to the taste of these animals than salt, nothing is more salutary for them, when it is given to them in moderation; and in some places, they put into the sheep-pen a bag of salt, or a salt stone, which they will all lick by turns.

Nothing contributes more to fatten sheep, than to give them water in great quantity; and nothing prevents this advantage so much as the heat of the sun.

We frequently find worms in the livers of animals; and in the *Journal des Savans*, there is a description of worms found in the livers of sheep and oxen, as also in the German *Ephemerides*. One would think that these singular worms were only found in the livers of animals which chew the cud; but Mr. Daubenton has found some, which exactly resemble them, in the liver of the ass; and it is probable that they may be found in the livers of other animals. It has also been said, that butterflies have been found in the livers of sheep.

The operation of sheep-shearing is performed once a year. In France it is performed in the month of May, after the sheep have been well washed, in order to make the wool as clean as possible. In April it would be too cold; and if they were to wait till the months of June and July, there would not be time enough for the wool to grow during the summer, to preserve them from the cold in the winter. The wool of ewes is usually better, and in greater abundance, than that of sheep; that on the neck, and the top of the back, is the best; that on the thighs, the belly, the tail, the throat, &c. is not so good; and that taken from beasts which are sick or dead is the worst; that which is white, is preferable to grey, brown, or black, because in dying it will take any colour. For the quality, that which is smooth is better than that which is frizzled; it is also said, that sheep whose wool is frizzled, are not so healthy as others. Another considerable advantage may be made of sheep, which is, by letting them be on ground we wish to improve. The dung, the urine, and the heat of the bodies of these animals, will, in a little time, enrich the most exhausted,

exhausted, cold, and infertile ground. A hundred sheep, in one summer, will enrich eight acres of land for six years.

The ancients have said, that all animals which chew the cud, have tallow; but this is only true of the sheep and the goat; and that of the goat is more abundant, whiter, drier, firmer, and of a better quality than any other. Grease differs from tallow, by being always soft; instead of which, the fat gets harder as it gets colder; and it is mostly about the loins that this suet is amassed in the greatest quantities, and the left loin has always a larger quantity than the right. Sheep have no other fat about them but suet; and this matter is so predominant in their habit, that all the extremities of the body are edged with it; even the blood contains a considerable quantity.

The wool of Italy, Spain and England, is finer than the wool in France.

Those animals with large, long tails, which are so common in Africa and Asia, and to which travellers have given the name of Barbary sheep, appear to be of a different species from our sheep, as well as the lamb of America.

THE GOAT.] The species of animals are all separated by such an interval, that there seems between them only the necessary space to draw a line of separation. The ass might almost replace the horse; and, if the species of sheep were to fail, that of the goat might supply the loss. The goat, like the sheep, furnishes milk, and even in greater abundance; she also has suet in abundance; her hair, though rougher than wool, serves, however, to make very good stuffs; and her skin is worth more than the skin of the sheep. The flesh of the young goat also nearly resembles that of the lamb. These auxiliary species are wilder and more robust than the principal species. The ass and the goat do not require so much care as the horse and the sheep; for they every where find food to support them, and browse equally on plants of all kinds, even coarse herbs, and bushes with thorns on them. They are less affected with the intemperance of the climate, and can do better without the help of man; and the less dependance they have on us, the more they seem to belong to nature.

Although the goat is a distinct species, and perhaps more distant from that of the sheep than the species of the ass is from that of the horse, yet the goat will willingly couple with the sheep, the ass with the mare, and are sometimes prolific; but they have never introduced any intermediate

species between the goat and the sheep. These two species are distinct, remaining constantly separated, and always at the same distance from each other, and have never been changed by this mixture, or produced any new stock, or new breed of intermediate animals; for they have, at most, only produced different individuals, which has no influence on the unity of each primitive species, and which, on the contrary, confirms the reality of their different characteristics.

The goat has naturally more understanding, and can shift better for herself than the sheep; she comes voluntarily, and is easily familiarised; she is sensible of caresses, and capable of attachment; she is also stronger, lighter, more agile, and less timid than the sheep; she is lively, capricious and lascivious.

Goats are fond of straying in solitary places, are fond of climbing up steep places, sleeping on the tops of rocks, and on the brink of precipices.

The inconstancy of this animal's nature is shewn by the irregularity of her actions; she walks, stops short, runs, jumps, advances, retreats, shews, then hides herself, or flies, and this all from caprice, or without any other determinate cause than her whimsical vivacity: and all the suppleness of the organs, all the nerves of the body, are scarcely sufficient for the petulance and rapidity of these motions, which are all natural to her.

That these animals are naturally fond of mankind, and that in uninhabited places they do not become wild, the following anecdote is a striking confirmation. In 1698, an English vessel having put into harbour at the isle of Bonavisse, two negroes presented themselves on board, and offered the English as many goats as they chose to carry away. At the surprize which the captain shewed at this offer, the negroes observed there were but twelve persons in all the island; that the goats multiplied so fast, that they became troublesome; and that, far from having any trouble in taking them, they followed them with a kind of obstinacy, like domestic animals.

Goats go five months with young, and bring forth at the beginning of the sixth month; they suckle the young ones for about a month or five weeks; so that it may be reckoned about six-and-twenty weeks from the time of their coupling till the time that the young kid begins to eat. The goat generally produces one kid, sometimes two, very rarely three, and never more than four; and she brings forth young, from a year or eighteen months, to seven years. The knobs in the horns, and their teeth, ascertain their age. The number

ber of teeth is not always the same in female goats; but they have usually fewer than the male goat, which has also the hair rougher, and the beard and the horns longer. These animals, like oxen and sheep, have four stomachs, and chew the cud. This species is more diffused than the sheep, and goats like ours are found in several parts of the world, only in Guinea, and other warm countries, they are smaller; but in Muscovy, and other cold climates, they are larger. The goats of Angora, and of Syria, have ears hanging down, and are of the same species with ours; they mix and produce together, even in our climate; the males have horns almost as long as the common goat; but the circumference and directions are very different; they are extended horizontally on each side of the head, and form spirals, somewhat like a worm. The horns of the female are short, and first turn round backwards, then bend down, and turn round before, so much, that they end near the eyes; and in some their circumference and direction vary. The male and female goat of Angora, which I have seen, are such as I have described; and these goats, like all the animals of Syria, have the hair very long and thick, and so fine, that stuffs have been made of it, almost as handsome and glossy as our silks. It is, in fact, what is commonly termed *mohair*.

THE SWINE.] I shall treat of the swine, the hog of Siam, and the wild boar, at the same time, because they form all three but one and the same species; one is wild, the other two are domestic.

Aristotle first divided quadrupeds into beasts with the hoof entire, those with cloven feet, and the species which have claws; and he allows that the hog is of an ambiguous nature; but the only reason he gives, is, that in Illyria swine are found which have hoofs, and in some other parts a species which have claws. This animal is also a kind of exception to the two general rules of nature, viz. that the larger animals are, the fewer young they produce at a birth; and that of all animals, those which have claws are the most prolific. The hog, though in its make greatly above the middling size, produces more than any such animal, or indeed, than any other quadruped.

To the singularities we have already related, we shall add another, which is, that the fat of the hog is different from that of almost all other quadruped animals, not only in its consistence and quality, but also in its position in the body
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of the animal. The fat of man, and of animals which have no tallow, such as the dog, the horse, &c. is mixed pretty equally with the flesh; the tallow in the ram, the goat, the stag, &c. is found only in the extremities of the flesh; but the fat of the hog is neither mixed with the flesh nor collected at the extremities of the flesh; it covers it all over, and forms a thick, distinct, and continued bed or layer, between the flesh and the skin. The hog has this in common with the whale, and other cetaceous animals, the fat of which is only a kind of lard, nearly of the same consistence with, but more oily than, that of the hog. This lard in cetaceous animals also forms beneath the skin a bed of many inches in thickness, which envelopes the flesh.

There are only the hog, and two or three other species of animals, which have defensive or canine teeth very long: they differ from the other teeth, by coming out at the front, and growing during their whole lives. In the elephant and sea-cow, they are cylindrical, and some feet in length; in the wild-boar and male hog, they are partly bent in form of a circle; and I have seen them from nine to ten inches in length. They are not very deep in the socket, and have also, like those of the elephant, a cavity at the superior extremity; but the elephant and sea-cow have only these defensive teeth in the superior jaw, and even want canine teeth in the inferior jaw; instead of which, the male hog and wild boar have them in both jaws, and those of the inferior are the most useful to the animal: these are also the most dangerous; for it is with these lower tusks the wild boar wounds.

Of all quadrupeds the hog appears the most rough and unpolished. His voraciousness apparently depends on the continual want which he has to fill the vast capaciousness of his stomach. It is the roughness of the hair, the hardness of the skin, and the thickness of the fat, which render these animals so insensible to blows. Mice have been known to lodge in their backs, and eat their fat and their skin, without their seeming sensible of it. Their other senses are good; and the huntsmen know that wild boars both see, hear, and smell, at a great distance; since, in order to surprise them, they wait in silence during the night, and place themselves under the wind, to prevent the boars perceiving their smell, of which they are sensible at a great distance, and which always immediately makes them change their road.

This imperfection in the senses of the taste and touch, is still more augmented by a distemper which is called the measles,

meazles, and which renders them almost absolutely insensible. This disorder proceeds in general from the coarseness of their food ; for the wild boar, which usually lives on corn, fruits, acorns, and roots, is not subject to this distemper, any more than the young pig whilst it sucks. This is only to be prevented by keeping the domestic hog in a clean stable, and giving him plenty of wholesome food : by this means his flesh will become excellent to the taste, and the lard firm and brittle, if, as I have seen practised, he is kept for a fortnight or three weeks before he is killed, in a clean stable without litter, giving him no other food than dry corn ; for this purpose we should choose a swine of about a year old, full of flesh and fat.

THE WILD BOAR is hunted by dogs, or else taken by surprize in the night by the light of the moon. As he runs but slowly, leaves a strong odour behind him, defends himself against the dogs, and wounds them dangerously, so he should not be hunted by dogs designed for the stag and the goat ; for this hunting spoils their scent, and learns them to go slowly. The oldest only should be attacked, and these are easily known by their traces : a young wild boar, of three years old, is difficult to take, because he runs a great way without stopping ; instead of which, a wild boar that is older, does not run far, suffers himself to be closely hunted, and has no great fear of the dogs. In the day, he usually hides himself in the thickest and most unfrequented part of the wood, and in the evening and at night he goes out to seek for food. In summer, when the corn is ripe, it is easy to surprize him ; but mostly so among oats, where he frequents every night. As soon as he is killed, the hunters immediately cut the testicles, the smell of which is so strong, that if five or six hours were to elapse without cutting them out, all the flesh would be infected ; and in an old wild boar the head only is good to eat ; instead of which, the flesh of the young wild boar is extremely delicate.

No one that has lived in the country ever so little, is ignorant of the profits arising from the hog : his flesh sells for more than that of the ox, the lard for double, the blood, the bowels, the viscera, the feet, and the tongue, when properly prepared, are all fit to eat. The dung of the hog is much colder than that of other animals, and should not be used for any but hot and dry lands. The skin hath its use, for
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sieves are made of it; and brooms, brushes, and pencil-brushes are made of the hair. The flesh of this animal takes salt and salt-petre better than any other, and will keep longer salted.

This species, though abundant, and greatly spread in Europe, in Africa, and in Asia, was not, however, found on the Continent of the new world. They were transported by the Spaniards, who have carried black hogs to the Continent, and to almost all the large islands of America; they are multiplied and become wild in many places; and resemble our wild boars, with this difference, that the body is shorter, the head larger, and the skin thicker, and domestic hogs in warm climates are all black like wild boars.

THE HOG OF SIAM resembles the wild boar more than the common hog. One of the most evident signs of degeneration is the ears, which become much more supple when the animal changes into the domestic state: in short, those of the domestic hog are not near so stiff, are much longer, and more pendant, than those of the wild boar, which should be looked on as the model of the species.

C H A P. VIII.

Of another Class of domestic Animals—The Dog—Its varieties—Of the Cat, &c.

THE largeness of the make, the elegance of the form, the strength of the body, the freedom of the motions, and all the exterior qualities, are not the noblest properties in an animated being; and as in mankind, understanding is preferred to figure, courage to strength, and sentiment to beauty; so the interior qualities are those which we esteem most in animals: for it is in these that they differ from the automaton, it is by these they are raised above the vegetable, and made to approach nearer to ourselves; it is their sense which ennobles their being, which regulates, which enlivens it, which commands the organs, makes the members active, gives birth to desire, and gives to matter progressive motion, will, and life.

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The dog, independently of his beauty, vivacity, strength, and swiftness, has all the interior qualities which can attract the regard of man. The tame dog comes crawling to lay at his master's feet his courage, strength, and talents, and waits his orders to use them; he consults, interrogates, and beseeches; the glance of his eye is sufficient; he understands the signs of his will; without the vices of man, he has all the ardour of sentiment, and, what is more, he has fidelity and constancy in his affections; no ambition, no interest, no desire of revenge, no fear but that of displeasing him; he is all zeal, all warmth, and all obedience; more sensible to the remembrance of benefits than of wrongs, he soon forgets, or only remembers them to make his attachment the stronger; far from irritating, or running away, he even exposes himself to new proofs; he licks the hand which is the cause of his pain, he only opposes it by his cries, and at length entirely disarms it by his patience and submission.

More docile and flexible than any other animal, the dog is not only instructed in a short time, but he even conforms himself to the motions, manners, and habits of those who command him; he has all the manners of the house where he inhabits; like the other domestics, he is disdainful with the great, and rustical in the country, always attentive to his master; and, striving to anticipate the wants of his friends, he gives no attention to indifferent people, and declares against those whose station makes them importunate; he knows them by their dress, their voice, their gestures, and prevents their approach. When the care of the house is intrusted to him during the night, he becomes more fiery, and sometimes ferocious; he watches, he walks his rounds, he scents strangers afar off; and if they happen to stop, or attempt to break in, he flies to oppose them, and by reiterated barkings, efforts, and cries of passion, he gives the alarm. As furious against men of prey as against devouring animals, he flies upon, wounds, and tears them, and takes from them what they were endeavouring to steal; but, content with having conquered, he rests himself on the spoils, will not touch it even to satisfy his appetite, and at once gives an example of courage, temperance, and fidelity.

Thus we may see of what importance this species is in the order of nature. By supposing for a moment that they had never existed; without the assistance of the dog, how could man have been able to tame, and reduce into slavery,

very, other animals? How could he have discovered, hunted, and destroyed, wild and obnoxious animals? To keep himself in safety, and to render himself master of the living universe, it was necessary to begin by making himself friends among animals, in order to oppose them to others. The first art, then, of mankind, was the education of dogs, and the fruit of this art was the conquest and peaceable possession of the earth.

The dog, faithful to man, will always preserve a portion of empire, and a degree of superiority over other animals; he commands them, and reigns himself at the head of a flock where he makes himself better understood than the voice of the shepherd; safety, order, and discipline are the fruits of his vigilance and activity; they are a people who are submissive to him, whom he conducts and protects, and against whom he never employs force unless it be to maintain peace. But it is above all in war against those animals which are his enemies, or which are independent, that his courage shines forth, that his understanding is displayed, and that his natural and acquired talents are united. As soon as the sound of the horn, or the voice of the huntsman, has given the signal of an approaching war, filled with a new ardour, the dog expresses his joy by the most lively transports, and shews by his motions, and cries of impatience, his desire to combat and to conquer; then, walking in silence, he searches to know the place where his enemy is, to discover, and surprise him; he seeks out his traces, he follows them step by step, and, by different cries, indicates the time, the distance, the species, and even the age, of what he is in pursuit of.

In deserts, and depopulated countries, there are wild dogs which in their manners differ only from wolves by the facility with which they are tamed; they unite also in large troops, to hunt and attack by force wild boars and bulls, and even lions and tygers. In America, the wild dogs spring from a breed anciently domestic, having been transported from Europe; and having been either forgotten or abandoned in these deserts, are multiplied to such a degree that they go in troops to inhabited places, where they attack the cattle, and will sometimes even insult the inhabitants. They are then obliged to drive them away by force, and to kill them like other ferocious animals; and in fact, dogs are such till they become acquainted with man: but when we approach them with gentleness, they grow tame, soon become familiar, and remain faithfully

fully attached to their masters; instead of which, the wolf, although taken young, and brought up in the house, is only gentle in his youth, never loses his desire for prey, and sooner or later gives himself up to his fondness for rapine and destruction.

The dog may be said to be the only animal whose fidelity may be put to the proof; the only one which always knows his master and his friends; the only one which, as soon as an unknown person arrives, perceives it; the only one which understands his own name, and which knows the domestic call; the only one which has not confidence in himself alone; the only one which when he has lost his master, and cannot find him, calls him by his lamentations; the only one which, in a long journey, a journey that perhaps he has been but once, will remember the way and find the road; the only one, in fine, whose talents are evident, and whose education is always good.

Of all animals, moreover, the dog is the one whose understanding is most susceptible of impressions, and most easily taught by moral causes; he is also, above all other creatures, most subject to the variety and other alterations caused by physical influences. The temperament, the faculties, and habits of the body vary prodigiously, and the form is not uniform: in the same country, one dog is very different from another dog, and the species is quite different in itself in different climates.

But, what is most difficult to ascertain in the numerous variety of different races, is the character of the primitive and original breed. How are we to know the effects produced by the influence of the climate, food, &c.?

As amongst domestic animals, the dog is, above all others, that which is most attached to man; that which, living like man, lives also the most irregularly; that in which sentiment predominates enough to render him docile, obedient, and susceptible of all impressions, and even of all constraint, it is not astonishing, that of all animals this should also be that in which we find the greatest variety, not only in figure, in height, and in colour, but in every other quality.

There are also some circumstances, which still concur to this change: the dog in general lives but a short time; he produces frequently, and in pretty large numbers; and as he is perpetually beneath the eyes of man, as soon as by a chance usual to nature, there may have been found among some individuals, singularities, or apparent varieties,

endeavours may have been used in order to perpetuate them, by uniting together these singular individuals, as we do at present, when we want to procure new breeds of dogs, and other animals:

Dogs which have been abandoned in the deserts of America, and have lived wild for a hundred and fifty, or two hundred years, though changed from their original breed when they are sprung from domestic dogs, have notwithstanding this long space of time retained, at least in part, their primitive form, and travellers report that they resemble our greyhound. These wild dogs, however, are extremely thin and light; and as the greyhound does not differ much from the cur, or from the dog which we call the shepherd's dog, it is natural to think, that these wild dogs are rather of this species, than real greyhounds; since on the other side, ancient travellers have said, that the dogs of Canada had the ears straight like foxes, and resembled the middle-sized mastiff, that is, our shepherd's dog, and that those of the deserts of the Aratilles isles had also the head and ears very long, and which in appearance very much resemble foxes.

Besides this, in searching with a view to find what travellers have said of the forms of dogs of different countries, we find, that dogs of cold climates have all long snouts and straight ears; that those of Lapland are small, that their ears are straight, and their snouts pointed; that those of Siberia, known by the name of wolf-dogs, are larger than those of Lapland; but that they have also the ears straight, the hair rough, and the snout pointed; that those of Iceland, have also some resemblance to those of Siberia; and that, even in warm climates, such as the Cape of Good Hope, the dogs natural to the countries have sharp snouts, straight ears, the tail dragging on the ground, and the hair shining, but long and frizzled.

We may presume, then, with some appearance of truth, that the shepherd's dog is, of all dogs, that which approaches nearest to the primitive races of this species; since, in all countries inhabited by savages, or, at least, by men half-civilized, the dogs resemble this breed more than any other; since, on the whole continent of the new world, they had no other; since they are to be found only in the north and south of our continent, and since, in France, where this species is usually called the shepherd's dog, and in other temperate climates, it is still more numerous; though we are much more occupied in

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giving birth to, or in multiplying, the breeds which are more pleasing, than preserving those which are more useful, and which we have disdained and abandoned to the peasants, who have the care of our flocks.

The dog, when he is born, is not entirely finished. In this species, as in those of all animals which produce in great numbers, the young ones, at the time of their birth, are not so perfect as those of animals which only produce one or two. Dogs are commonly born with their eyes shut: the two eye-lids are not only closed, but adhere by a membrane, which breaks away as soon as the muscle of the superior eye-lid is become strong enough to raise itself, and to overcome this obstacle; and the greater number of dogs have not their eyes open till the tenth or twelfth day. At this time, the bones of the skull are not finished, the body is puffed out, the snout is swelled, and they have not their proper form; but in less than a month they learn to make use of all their senses, and begin to have strength and a swift growth. In the fourth month, they have some of their teeth; and these, as in other animals, are soon replaced by others, which do not fall out again: they have in all forty-two teeth.

Bitches go with young nine weeks, that is, sixty-three days, but never less than sixty. Length of life in dogs is like that of other animals, proportioned to the time required for their growth; for if they are about two years in growing, so they live also twice seven years.

In the Memoirs of the Academy of Sciences, we find the history of a bitch, which having been accidentally left behind in a country-house, subsisted forty days without any other food than the stuff or the wool of a mattrass that she had torn. Water seems to be still more necessary for dogs than food: they drink frequently and abundantly; and it is even a vulgar opinion, that if they want water for any length of time, they become mad.

To give a clearer idea of the order of dogs, of their generation in different climates, and of the mixture of their breeds, I here join a table, or rather a kind of genealogical tree, in which, with a glance of the eye, all the different varieties of the species may be seen.

The shepherd's dog is the stock or body of the tree. This dog, transported into the rigorous climate of the North, as into Lapland, for example, has become ugly and small; he seems, however, to have been kept up, and even brought to perfection, in Iceland, Russia, and Siberia,

beria, where the climate is rather less rigorous, and where the people are more civilised. These changes have been occasioned by the influence of climate alone, which has produced no great alteration in the form; for all these dogs have straight ears, long and thick hair, and a wild look.

The same shepherd's dogs, transported into temperate climates, and among people who are quite civilised, such as those of England, France, or Germany, lose their savage air, their straight ears, their long, thick, and rough hair, and become mastiff, hound, or bull-dog, by the influence of climate merely. Of the mastiff, and the bull-dog, the ears are still partly straight, or only half-pendant; and in their manners and sanguinary disposition they resemble the dog from which they drew their origin. The hound is the most distant of the three: the long pendant ears, the docility, gentleness, and, we may say, timidity of this dog, are so many proofs of the great degeneration, or, better perhaps to express it, the great perfection, which a long state of subjugation has produced, joined to a careful, and well-followed education.

The hound, the setting-dog, and the terrier, are only one and the same race of dogs; for it has been remarked, that the same birth has produced setting-dogs, terriers, and hounds, though the hound bitch has only been covered by one of the three dogs.

The beagle, and almost all sorts of dogs transported into Spain and Barbary, have the hair fine, long, and thick, and become spaniels and barbets. The great and little spaniel, which differ only in size, when transported into England, change their colour from black to white, and by the influence of the climate are become large, small, and shabby: to these we may also join the terrier, which is but a black beagle, like the others, but with liver-coloured marks on the four feet, the eyes, and the snout.

The shepherd's dog, transported to the north, is become a large Dane, and into the south, is become a greyhound. The large greyhounds come from the Levant; those of a middling size from Italy: and greyhounds from the latter of these places, when transported into England, become smaller greyhounds.

The large Danes, transported into Ireland, Ukrain, Tartary, Epirus, and Albany, are become large Irish dogs, and in size surpass all the rest of the species.

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The bull-dog, transported from England into Denmark, is become a small Dane; and this small Dane, when transported into warm climates, loses its hair entirely, and becomes the naked Turk dog. All these races, with their varieties, have been produced solely by the influence of climate, joined to the effect of their food, and of a careful education; the other dogs are not of a pure race, and come from a mixture of these first races.

The greyhound, and the shepherd's dog, have produced the mongrel greyhound, which is called the greyhound with wolf's clothing. Of this mongrel the snout is not so thin as that of the Turkish greyhound, which is very rare in France.

The large Dane, and the large Spaniel, have produced together the dog of Calabria, which is a handsome dog with long, thick hair, and which is taller than the larger mastiff.

The spaniel and the terrier produce another kind of dog, which is called the Burgundy spaniel. The spaniel and the little Dane produce the lion-dog, which is very scarce.

The dogs with long, fine, and curled hair, which are called dogs of Burgos, and which are of the size of the largest barbets, come from the large spaniel and the barbet.

The little barbet comes from the small spaniel and the barbet.

The bull-dog produces, with the mastiff, a mongrel, which is called the strong bull-dog, and is much larger than the real bull-dog, and approaches the bull-dog more than the mastiff.

The pug comes from the English bull-dog, and the little Dane.

All these races are simple mongrels, and come from the mixture of two pure races; but there are also other dogs which may be called double mongrels, because they come from the mixture of a pure race, and of one already mixed.

The shock-dog is a double mongrel, which comes from the pug and the small Dane.

The dog of Alicant is also a double mongrel, which comes from the whelp and the little spaniel.

The Maltese, or lap-dog, is a double mongrel, and comes from the small spaniel and the barbet.

THE CAT.—The cat, though an animal of prey, is a useful domestic. It is neither wanting in sagacity nor sentiment; but its attachments are stronger to places than to persons. The form of its body corresponds with its disposition. The cat is handsome, light, adroit, cleanly, and voluptuous: he loves ease, and searches out the softest furniture in order to repose on, and rest himself.

Cats go with young fifty-five or fifty-six days; they are not so prolific as dogs, and their usual number is four, five, or six. Young cats are gay, lively, pretty, and would be very proper to amuse children, if the strokes of their paws were not to be feared. Their disposition, which is an enemy to all restraint, renders them incapable of a regular education. We are told, nevertheless, of the Greek friars of Cyprus, having taught cats to hunt, take, catch, and destroy the serpents with which that island was infested; their scent, which in the dog is an eminent quality, is far from being good, and therefore they do not pursue animals which they no longer see; they do not hunt, but wait and attack them by surprise.

The most immediate physical cause of this inclination, which they have to spy out, and surprise other animals, comes from the advantage which they receive from the particular conformation of their eyes. The pupil, in man, as well as in the greater part of animals, is capable of a certain degree of contraction and dilatation; it enlarges a little when there is no light, and contracts when it becomes too strong.

In the eye of the cat, and of nocturnal birds, this contraction and dilatation are so considerable, that the pupil, which in obscurity is large and round, becomes in broad day, long and narrow like a line; and for this reason these animals see better during the night than during the day, the form of the pupil being always round when it is not constrained. During the day, there is a continual contraction in the eyes of the cat, and it is only by effort, as it were, that he sees in a strong light; whereas at twilight, the pupil resuming its natural form, he sees perfectly, and profits from this advantage to know, attack, and surprise other animals.

Cats seem to have a natural dread of water, cold, and bad smells. They are very fond of perfumes, and gladly suffer themselves to be taken and caressed by persons who use them. The scent of Valerian has so powerful and so delicious an effect on them, that they appear transported
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with pleasure by it; and, in order to preserve this plant in gardens, it is common to surround it with a close fence. Cats will smell it from afar, will run and rub themselves with it, and will pass and repass so often over it, as to destroy it in a short time.

As they are exceeding cleanly, and as their coat is always dry and shining, their hair easily electrifies; and sparks are seen to come from it, when rubbed with the hand in any dark place. Their eyes shine in the dark, almost like diamonds, and reflect outwardly, during the night, the light which they may be said to have imbibed during the day.

In this climate, we know but one species of the wild cat; and it appears from the testimony of travellers, that this species is found in almost all climates, without any great variety. There were some of them on the continent of the New World before it was discovered: a huntsman carried one which he had found in the woods to Christopher Columbus; this cat was of the common size, the hair of a dark grey, with the tail very long, and very strong. There were some of the same sort of wild cats in Peru, though they had no tame ones; and there are also some in Canada, in the country of the Illinese, &c. They have been seen in several parts of Africa, as in Guinea, at the Gold Coast, at Madagascar, where the original inhabitants had even domestic cats; at the Cape of Good Hope, where Kolbe says, there are also, though in a small number, wild cats of a blue colour; and these blue, or rather slate-coloured cats, are found again in Asia.

In general it may be remarked, that, of all the climates of the inhabited earth, those of Spain and Syria are the most favourable to the beautiful varieties of Nature. The sheep, the goats, the dogs, the cats, the rabbits, &c. of those countries have the finest wool, the most beautiful and the longest hair, the most agreeable and the most varied colours. The colour of the wild cat, and its hair, like those of most other wild animals, are rather coarse; when tamed, the latter becomes more soft, the former more variegated; and in the favourable climate of Chorasán and Syria, the latter becomes longer, finer, more copious, the former uniformly softened; the black and red changing into a transparent brown, and the dark brown into an ash-grey. By comparing a wild cat of our forests with one of those of Chorasán or Syria, we shall find that the only difference between them consists in this shaded variety of colours;

and as these animals have more or less white upon the belly and the sides, it is easy to conceive, that, in order to have cats entirely white, and with long hair, such as we properly term cats of Angora, we have only to select from this race those which are most white on the belly and the sides, and to unite them together, in like manner as is done with rabbits, with dogs, with goats, with stags, with deer, &c. In the province of Pe-chi-ly, in China, there are cats with long hair, and pendant ears, of which the Chinese ladies are exceedingly fond. These domestic cats with pendant ears, of which we do not possess a more ample description, are, doubtless, still more remote than those with straight ears, from the race of the wild cat, which, nevertheless, is the original and primitive race of all cats.

CH A P. IX.

*Of certain intermediate Animals between wild and domestic.—
The Stag, or Red Deer.—Of the Fallow-deer, the Roe-buck, &c.*

THE STAG is one of those mild, tranquil, innocent animals, which seem as if they were created solely to adorn and animate the solitude of the forests, and to occupy, remote from man, the peaceful retreats of Nature. His light and elegant form; his flexible, yet nervous limbs; his head rather adorned, than armed, with a living substance, which, like the branch of a tree, is every year renewed; his grandeur, his swiftness, his strength, sufficiently distinguish him from the rest of the inhabitants of the forest.

The old stags shed their horns first, which happens about the end of February, or the beginning of March. Stags in their seventh year do not undergo this change till the middle or the end of March; nor do those in their sixth year, till the month of April.

After they have shed their horns, they separate from each other; the very young ones alone associating together. They remain no longer in covert; they seek the beautiful parts of the country, the groves, and the open coppices, where they remain all the summer, till they recover the antlers which were wont to adorn their brows; and, during this season, they carry their heads low, for fear of striking them against the branches; for they are exceedingly tender till they arrive at perfection. The horns of the oldest stags are

are scarcely half repaired by the month of May; nor do they attain their full length and hardness till about the end of July. The horns of the young stag are very late shed, and very late recovered; but when these are completely lengthened, and are become quite hard, they rub them against the trees, in order to clear them from the scurf with which they are covered.

The hinds, or females, carry their young eight months and a few days. They are not all prolific; and one sort there is in particular which is always barren. The fawn retains this appellation no longer than till it is six months old; then the knobs begin to appear, and it takes the name of a knobber, which it bears till these knobs are lengthened to so many points, whence they are termed prickets, or brockets. It does not quit its mother early, though it grows fast, but follows her all the summer. In winter, the hinds, the knobbers, the prickets, and the young stags, resort to the herd, forming troops, which are more numerous in proportion as the season is more severe. In spring they divide, the hinds retiring to bring forth their young; and at this time there is scarcely any but the prickets and the young stags which go together. In general, the stags are inclined to remain with each other, and to roam abroad in companies; nor is it but from fear or necessity that they are ever found dispersed or separated.

The growth of the horns appears to depend on the redundancy of the fluids, and has a near connection with the production of the seminal fluid, since, when castrated, the horns of the stag cease to grow. The beauty of this, as indeed of every part, depends much upon their food; for a stag which lives in a plentiful country, where he feeds at his ease, where he is neither disturbed by men nor dogs, where, after having eaten without interruption, he may lie down and ruminate in quiet, has always a beautiful head, high, open, palmated, large, and well-adorned at top, broad and curled at bottom, with a great number of long and strong antlers; whereas, in a country where he has neither sufficient food nor repose, his head will be in these respects the reverse, insomuch, that it is no difficult matter to distinguish by the horns of a stag, whether or not he inhabits a plentiful and quiet country, and whether or not he has been well nourished.

The branches which sprout from the head of the stag, in their make and growth, resemble those of a tree; their substance also is, perhaps, more of the nature of wood than of

bone: it is, as it were, a vegetable grafted upon an animal, which partakes of the nature of both, and forms one of those shades by which Nature always approximates two extremes.

The stag passes his whole life in the alternatives of plentitude and want, of corpulence and leanness, of health and sickness, without having his constitution much affected by the violence of the change; nor is the duration of his life inferior to that of other animals, which are not subject to such vicissitudes. As he is five or six years in growing, so he generally lives seven times that number of years; that is, thirty-five or forty years. What has been reported, therefore, concerning the prodigious longevity of the stag, is without any good foundation, though supported by the story of one which was taken by Charles VI. in the forest of Senlis, with a collar round its neck, whereon was inscribed, "*Cæsar hoc me donavit;*" and people chose rather to believe that this animal had lived a thousand years, and had received this collar from a Roman Emperor, than to conclude that he might come from Germany, where the Emperors have always assumed the title of Cæsar.

The horns of the stag continue to increase in bulk and height from the second year to the eighth; they remain beautiful, and much the same, during their vigour of life; but as their body declines with age, so do their horns decline also.

It is but seldom that our stags have more than twenty or twenty-two antlers, even when their head is in its most beautiful state; and, as the size of the stag's head depends on the quantity of his food, so the quality of his horns is found, in like manner, to depend on the quality of it; it is, like the wood of the forest, large, soft, and light, in moist and fertile countries; and, on the contrary, short, hard and heavy, in such as are dry and barren.

The most common colour of the stag is yellow, though there are many found of a brown, and many of a red colour. White stags are much more uncommon, and seem to be stags become domestic. The colour of the horns, like that of the hair, seems in particular to depend on the nature and age of the animal, and in general on the impression of the air. The horns of the young stags are whiter than those of the old ones. Of those stags also whose hair is of a light yellow, the horns are often of a fallow hue, and disagreeable to the eye.

This

This animal seems to have good eyes, an exquisite smell, and an excellent ear. When he would hearken to any thing, he raises his head, pricks up his ears, and then he hears from a great distance. When he issues from a little coppice, or some other spot half covered, he stops in order to take a full view around him, and then snuffs up the wind in order to try whether he can discover the scent of aught that may give him disturbance. Though naturally rather simple, he is yet far from being destitute of curiosity and cunning. If any one whistles, or calls aloud to him from a great distance, he instantly stops short, and gazes with fixed attention, with even a kind of admiration; and if he has neither arms nor dogs, he passes along quietly, and without altering his pace. With equal tranquillity and pleasure he seems also to listen to the shepherd's pipe, or flageolet; and the hunters, in order to embolden them, sometimes use these instruments. In general, he fears men much less than he does dogs, and entertains neither distrust nor artifice, but in proportion as he is disturbed. He eats slowly, chooses his food, and seeks afterwards to repose himself, that he may ruminate at leisure, though the act of rumination he does not seem to perform with the same ease as the ox; nor is it without undergoing much violence, that the stag can throw up the food contained in his first stomach. He seldom drinks in the winter, and seldomer still in the spring.

THE FALLOW-DEER.] No two animals can be more nearly allied than the stag and the fallow-deer; and yet no two animals keep more distinct, or avoid each other with more fixed animosity. They are never seen to herd in the same place; it is even rare, unless they have been transported thither, to find fallow-deer in a country where stags are numerous. They seem to be of a nature less robust and less savage than the stag; they are found but rarely wild in the forests, and are bred up in parks, where they are, as it were, half-domestic.

England is the country of Europe where they most abound; and there their flesh, which dogs are observed to prefer to that of all other animals, is held in no small estimation. It seems to be an animal formed for a temperate climate; for it is never found in Russia, and very rarely in the forests of Sweden, or in any other northern country; and, as the fallow-deer is an animal less savage, more delicate, and indeed it may be added, more domestic than the stag, it is likewise subject to a greater number of varieties.

Beside the common deer, and the white deer, we know of several other kinds still; the deer of Spain, for example, which are almost as large as stags, but whose neck is more slender, whose colour is more obscure, and whose tail is rather black than white underneath, and longer than that of the common deer; the deer of Virginia, which are almost as large as those of Spain; other deer, whose forehead is compressed and flattened between the eyes, whose ears and tail are longer than those of the common deer, and of whose hind legs the hoofs are marked with a white spot; and others, which are spotted or streaked with white, black, and yellow; and others still, which are entirely black.

The head of the buck, like that of the stag, is shed every year, and takes nearly the same time for repairing.

It frequently happens, that an herd of fallow-deer is seen to divide into parties, and to engage each other with great ardour. They both seem desirous of gaining some favourite spot of the park for pasture, and of driving the vanquished party into the coarser and more disagreeable parts. Each of these factions has its particular chief, namely, the oldest and the strongest of each herd. These lead on to the engagement; and the rest follow under their direction. Their combats are singular enough, from the disposition and conduct by which their mutual efforts seem to be regulated. They attack with order, and support the assault with courage; they come to the assistance of each other; they retire, they rally, and never yield the victory upon a single defeat. The combat is renewed every day, till at length the most feeble side is obliged to give way, and is content to escape to the most disagreeable part of the park, where alone they can find safety and protection.

From the age of two, till that of fifteen or sixteen, the fallow-deer is in a condition to produce, and, in fine, resembling the stag in all its natural habits, the greatest difference we find between these two animals, is in the duration of their lives. From the testimony of hunters, it has been mentioned, that the stag lives to the age of thirty-five or forty; and, on the same authority, it is asserted, that the fallow-deer lives but about twenty years; and as in size the latter is smaller than the stag, so it is probable, that in growth he is somewhat quicker.

THE ROE-BUCK.] The stag, as being the most noble among the tenants of the woods, inhabits the most secret parts of the forest, where the spreading branches form a lofty covert;

covert; while the roe-buck, as being of an inferior species, contents himself with a more lowly residence, and is seldom found but among the thick foliage of young trees and shrubs. But, if this animal is less noble, less strong, and less elevated in stature, he is, however, possessed of more grace, more vivacity, and even more courage, than the stag. Though but a very small animal, yet, when his young are attacked, he faces even the stag himself, and not unfrequently comes off victorious; he is more gay, more handsome, more active; his shape is more full and more elegant, and his figure is more agreeable; his eyes, in particular, are more brilliant, and more animated; his limbs are more supple, his movements quicker; and, possessed of equal vigour and agility, he bounds without effort.

The roe-buck differs from the stag, not only in superior cunning, but also in his natural appetites, his inclinations, and his whole habits of living. Instead of herding together like the latter, the species of the former live in separate families: the sire, the dam, and the young ones, form of themselves a little community, nor do they ever admit a stranger into it. All other animals of the deer kind, are inconstant in their affection. The roe-buck never forsakes his mate; and as they have been generally bred up together, the male and female form for each other the strongest attachment.

The female of this species goes with young five months and a half, and brings forth about the end of April, or the beginning of May. The hind goes more than eight months; and this is a circumstance which alone suffices to prove, that these animals are of a species so different, that they can never intermix, nor produce together an intermediate race. The female separates herself from the male, when she is about to bring forth, retiring into the thickest part of the woods, in order to avoid the wolf, which is her most dangerous enemy. At the expiration of about ten or twelve days, the fawns, of which there are generally two at a birth, attain strength enough to follow her. When she is threatened with any danger, she hides them in some deep thicket, offers herself to the danger, and allows herself to be chased in their stead.

The fawns continue to follow the buck and the doe eight or nine months in all; and upon separating, their horns begin to appear, as those of the stag, the first year, simple, and without antlers. These they shed at the latter end of autumn, and renew during the winter.

In the stag, the fallow-deer, and the roe-buck, there are two bony eminences, on which their horns grow, which begin to shoot at the end of five or six months, and which, in a little time longer, arrive at their full growth; and, far from enlarging themselves as the animal advances in age, they diminish, and are even the most certain index for discovering, every year, the advanced age of all the species.

As the female goes only five months and a half with young, and as the growth of the young roe-buck is quicker than that of the young stag, so his life is shorter; and I do not believe that it extends beyond twelve or fifteen years, at the farthest. The roe-bucks remain in winter in the thickest coppices, and live on briars, broom, heath, &c. In spring, they repair to the more open groves, and browse upon the buds and young fresh leaves of almost every tree; and this warm food, fermenting in their stomachs, inebriates them in such a manner, that they are then easily surpris'd.

It appears, that this species, which is not so numerous as that of the stag, and which is very seldom to be found in many parts of Europe, is much more abundant in America. There we hear only of two sorts, the red, which is the larger, and the brown, which is the smaller; and, as they are more commonly found in the northern than in the southern parts of that continent, so it may be presumed, that they differ more from each other there than they do in Europe. In Louisiana, for instance, they are extremely common, and are much larger than in France; they are also found at Brasil; for the animal which is there denominated the *Cujuacu-apara*, differs not from the European roe-buck, more than the Canadian stag differs from the French stag.

C H A P. X.

Of Wild Animals—The Hare, and the Rabbit.

THE HARE.] **T**HOSE species of animals which are the most numerous, are not always the most useful: but the species of the hare, and of the rabbit, are advantageous to us, both as to their number and their utility. Hares are universally and abundantly spread over the face of the whole earth; and rabbits, though they originated only in particular climates, do yet multiply so prodigiously

digiously in almost every place to which they are transported, that it is no longer possible to extirpate them, and no small art is required in order to diminish their number.

In those districts which are reserved for the chase, four or five hundred hares are killed in the course of perhaps one day's sport. These animals multiply amazingly; they are in a condition to engender in all seasons, and before the first year of their life is expired. The females do not go above thirty or thirty-one days with their young. They produce three or four, and as soon as these are brought forth, are again ready to receive the male; they likewise receive him while they are pregnant, and, by a particular formation of their genitals, are often found to have a superfoetation.

The young ones are brought forth with their eyes open; the mother suckles them for the space of twenty days; after which they separate themselves from her, and provide for their own subsistence; they do not withdraw themselves far from each other, nor from the place where they first drew breath; yet they live in solitude, and each composes for itself a form, at a little distance, as perhaps, at that of sixty or eighty paces. Thus, when we find a young leveret in one place, we are almost sure of finding one or two more in the neighbourhood. They feed more by night than by day; and their favourite articles of provision are, herbs, roots, leaves, fruit and grain; but above all, such plants as yield a milky juice. They even eat the bark of trees in winter. When they are reared at home, they are fed with lettuce and roots; but the flesh of these domestic hares is always of a bad flavour.

Hares sleep much, but always with their eyes open. They have no eye-lashes, and seem to have but bad eyes; as if, in order to recompence this defect, however, their hearing is exceedingly acute, and their ears are very large compared with the size of their body. They move these long ears with great facility, and use them as a helm, in order to direct their course, which is so rapid, that they easily outstrip all other animals. As their fore legs are much shorter than their hind ones, they can more easily mount than descend; for which reason, when they are pursued, their first object is to gain, if possible, some mountain. Their motion in running is a kind of gallop; they proceed without making any noise, because their feet are plentifully covered with hair, even underneath; and perhaps they are the

the only animals which have hair growing within their mouths.

The hare lives not above seven or eight years. They pass their lives in solitude, and in silence; and never are they known to exert their voice, but when they are forcibly laid hold of, tormented, or wounded. They are by no means so wild as by their habits might be supposed; they are gentle, and susceptible of a species of improvement. As they have a good ear, as they rest on their hind-feet of their own accord, and use their fore-legs like arms, some have been so tutored as to beat a drum, to gesticulate in cadence, &c.

In general, the hare is not devoid of the instinct necessary for its preservation, nor of sagacity sufficient to effect an escape from its enemies. It prepares for itself a form; and in winter, it chooses a spot which is exposed to the south, as in summer it does one which is situated to the north. It hides itself from view among hillocks of earth which are of the same colour as its hair. "I have seen," says Du Fouilloux, "a hare so cunning, that, as soon as it heard the hunter's horn, it started from its form, and, though at the distance of a quarter of a league from it, leaped to a pond, and there hid itself among the rushes, and thus escaped the pursuit of the dogs. I have seen a hare, which, after having run above two hours before the dogs, has dislodged another hare, and taken possession of its form. I have seen others swim over three ponds, of which the smallest was not less than eighty paces broad. I have seen others, which, after having been warmly chased for two hours, have entered a sheep-cot, through the little opening under the door, and remained among the cattle. I have seen others, which, when the dogs have chased them, joined a flock of sheep in the field, and, in like manner, remained with them. I have seen others, which, when they heard the dogs, have concealed themselves in the earth. I have seen others, which have gone along one side of a hedge, and returned by the other; so that there was only the thickness of the hedge between the dogs and the hare. I have seen others, which, after they had been chased for half an hour, have mounted an old wall of six feet high, and taken refuge in a hole covered with ivy."

The nature of the soil has a great influence on these, as well as on all other animals; the hares of the mountains are larger

larger and fatter than those of the plains, and are also of a different colour; the former being browner on the body, and whiter about the neck, than the latter, which are more inclined to red. On high mountains, and in the northern countries, they become white in the winter, and in summer recover their ordinary colour.

THE RABBIT.] Though the hare and the rabbit are externally, as well as internally, very much alike, yet as they do not intermix together, they form two distinct and separate species.

The fecundity of the rabbit is even greater than that of the hare; and, without crediting what Wotton has advanced, that one pair only, being left together in an island, produced six thousand in one year, it is certain, that these creatures multiply so prodigiously in countries which are proper for the breed, that the earth cannot furnish them with subsistence: they destroy herbs, roots, grain, fruit, and even trees and shrubs; and, were it not for the use we make of the dog and the ferret, they would reduce the country to a desert. The rabbit not only engenders and produces oftener than the hare, but it has more ways to escape from its enemies, and to avoid the sight of man.

This circumstance alone may suffice to prove, that the rabbit is superior to the hare in point of sagacity. Both are alike in their conformation, and both have it in their power to dig retreats to themselves. Both are timid to an excess; but the one, possessed of less art, is contented with forming for itself a residence on the surface of the earth, where it remains continually exposed; while the other, by a more improved instinct, takes the trouble to dig into the earth, and there to make itself an asylum; and so true is it, that they act in this case from sentiment, that we never see the domestic rabbit employed in the same work.

The domestic rabbits, like all other domestic animals, vary in their colour: white, black and grey belong properly to Nature. The black rabbits are the most scarce.

These animals are able to engender and produce at the age of five or six months. It is asserted, that they commonly attach themselves to one particular female, and never quit her. She goes with young thirty or thirty-one days, and will produce five, six, and sometimes seven or eight at a birth. Like the doe-hare, she has a double matrix, and of consequence can have in its womb at the same time, two

separate

separate litters. It appears, however, that super-foetations are less frequent in this species than in that of the hare.

A few days before they bring forth, they dig themselves a fresh burrow, not in a right line, but in a crooked direction, at the bottom of which they make an excavation; after which they tear a quantity of hair from their bellies, and make a kind of bed for the use of their little ones. For the first two days they never quit them: they never stir abroad, unless forced to do so from necessity, and return as soon as ever they have taken their nourishment. At this season they eat much and very quick; and thus they tend and suckle their young for more than six weeks. Till then the buck does not know them, nor does he enter the burrow which the doe has dug. Often, even when she quits it and leaves her little ones behind, she stops up the entry to it with earth, diluted with her urine; but when they begin to venture to the edge of the hole, and to eat groundsel and other herbs which the doe picks out for them, the buck begins to know them, to take them between his paws, to endeavour to give a gloss to their hair, to lick their eyes; and all of them, in succession, partake equally of his cares.

A gentleman, in my neighbourhood, who had amused himself with raising rabbits for many years, has communicated the following remarks to me:

“ I began,” said he, “ with only one male and one female, “ the former white, the latter grey; and of their produce, “ which was very numerous, the greatest part were grey, “ a good number of them white, and of a mixed colour, “ and some few black. These animals seem to have a “ great respect for paternal authority; at least I judge so, “ from the great deference which all my rabbits shewed for “ their first ancestor, whom I can always easily distinguish “ by his whiteness, and who is indeed the only male of that “ colour which I have preserved. It was to no purpose “ that the family augmented; those which, in their turn, “ became fathers, were still subordinate to him. Whenever “ they fought, whether on account of their females, or “ concerning their food, their great progenitor would run “ to the place of dispute with all speed, as soon as he heard “ the noise. No sooner did they perceive him, than every “ thing was presently reduced to order; and if he surprised “ any one of them actually assaulting another, he used to “ separate him from the rest, and punish him upon the “ spot. Another proof of his dominion over all his posterity,

“ rity, is, that they were accustomed to return at a whistle:
 “ whenever I gave the signal, how distant soever they
 “ might be, this old one immediately put himself at their
 “ head; and though he came first, yet he made them
 “ all file off, and enter before him; nor would he go in till
 “ the last.”

C H A P. XI.

*Of carnivorous Animals—The Wolf—The Fox—The Badger—
 The Otter—The Martin—The Pine Weasel—The Pole
 Cat—The Ferret—The Weasel—The Ermine.*

ANIMALS which have but one stomach, and whose intestines are short, are forced, like man, to feed on flesh. Of this affinity, and of this truth, we shall receive certain information by a relative comparison of the size of the intestinal canal in carnivorous animals, and in those that live solely on herbage. We shall then find, that the difference in their manner of living depends solely on the difference in their conformation, and that their nourishment is more or less solid, as the receptacle for it is more or less capacious.

Hence, however, it is not to be concluded, that those animals which live solely on herbage are, from physical necessity, as carnivorous animals are with respect to flesh, absolutely confined to one kind of sustenance. Solely is it to be understood, that those which have several stomachs, or very large intestines, may be supported without this substantial aliment so necessary to others. It is not meant, that they might not use it, or that if Nature had furnished them with arms, not only for the purposes of self-defence, but for those of attack and rapine, they would not have exerted them, and soon accustomed themselves to flesh and blood; since we find, that sheep, calves, goats, horses, greedily eat milk and eggs, which are animal food, and that, unaided by custom, they do not refuse meat which has been hashed and seasoned with salt.

Without a violation of truth, then, may it be said, that the generally-predominant appetite of animals is for flesh and other solid food, and that this appetite is more or less vehement, more or less moderate, according to the particular conformation of each animal; since, on taking a full view of Nature, we find it not only in man, but in qua-

draped animals, in fishes, in insects, and in worms, for which indeed all flesh seems to be particularly and ultimately destined.

THE WOLF.] The wolf is one of those animals whose appetite for animal food is the most vehement, and whose means of satisfying this appetite are the most various. Nature has furnished him with strength, with cunning, with agility, with all those requisites, in a word, which fit an animal for pursuing, overtaking, and conquering its prey; and yet, with all these, the wolf most frequently dies of hunger; for he is the declared enemy of man. Being long proscribed, and a reward offered for his head, he is obliged to fly from the habitations of man, and to live in the forest; where the few wild animals to be found, escape him either by their swiftness or their art, or are supplied in too small a proportion to satisfy his rapacity. When pressed with hunger, however, he braves danger, and comes to attack those animals which are under the protection of man, particularly such as he can readily carry away, lambs, sheep, or even dogs themselves; for all animal food comes then equally agreeable. If this excursion has succeeded, he often returns to the charge, till having been wounded, or closely pursued by the dogs or the shepherds, he hides himself by day in the thickest coverts, and, for a while, only ventures out at night; but, at last, when his necessities are very urgent, he boldly faces certain destruction: he attacks women and children, and sometimes ventures even to fall upon men; becomes furious by his continual agitations, and ends his life in madness.

The wolf, as well externally as internally, so nearly resembles the dog, that he seems modelled upon the same plan; and yet he only offers the reverse of the image. If his form be similar, his nature is, however, different; and indeed they are so unlike in their dispositions, that no two animals can have a more perfect antipathy to each other. A young dog shudders at the sight of a wolf; a dog who is stronger, and who knows his strength, bristles up at the sight, testifies his animosity, attacks him with courage, endeavours to put him to flight, and does all in his power to rid himself of a presence that is hateful to him. They never meet without either flying from, or fighting with each other. If the wolf is the stronger, he tears and devours his prey: the dog, on the contrary, is more generous, and content himself with his victory.

The

The dog, even in his savage state, is not cruel; he is easily tamed, and continues firmly attached to his master. The wolf, when taken young, becomes tame, but never has an attachment. Nature is stronger in him than education; he resumes, with age, his natural dispositions, and returns, as soon as he can, to the woods whence he was taken. Dogs, even of the dullest kinds, seek the company of other animals; they are naturally disposed to follow and accompany other creatures: the wolf, on the contrary, is the enemy of all society; he does not even keep much company with those of his kind. When they are seen in packs together, it is not to be considered as a peaceful society, but a combination for war: they testify their hostile intentions by their loud howlings, and by their fierceness discover a project for attacking some great animal, such as a stag or a bull, or for destroying some formidable dog. The instant their military expedition is completed, their society is at an end; they then part, and each returns in silence to his solitary retreat. There is not even any strong attachment between the male and female; they seek each other only once a year, and remain but a few days together.

The difference in the duration of the pregnancy of the she-wolf, who goes with young above an hundred days, and the bitch, who does not go above sixty, proves, that the wolf and the dog, so different in disposition, are still more so in one of the principal functions of the animal œconomy.

The wolf generally brings forth five or six, and sometimes even nine at a litter. The cubs are brought forth, like those of the bitch, with the eyes closed. The dam suckles them for some weeks, and teaches them betimes to eat flesh, which she prepares for them, by chewing it first herself. They do not leave the den where they have been littered, till they are six weeks or two months old. It is not, however, till they are about ten or twelve months old, and till they have shed their first teeth and completed the new, that the dam thinks them in a capacity to shift for themselves. Then, when they have acquired arms from Nature, and have learned industry and courage from her example, she declines all future care of them, being again engaged in bringing up a new progeny. These animals require two or three years for their growth, and live to the age of fifteen or twenty.

The wolf grows grey as he grows old, and his teeth wear, like those of most other animals, by using. He sleeps when his belly is full, or when he is fatigued, rather by

day than night, and is always very easily waked. He drinks frequently ; and in times of drought, when there is no water to be found in the trunks of old trees, or in the pools about the forest, he comes often, in the day, down to brooks, or lakes in the plain. Although very voracious, he yet supports hunger for a long time, and often lives four or five days without food, provided he is supplied with water.

The wolf has great strength, particularly in his fore-parts, in the muscles of his neck and jaws. He carries off a sheep in his mouth without letting it touch the ground, and runs with it much swifter than the shepherds who pursue him ; so that nothing but the dogs can overtake, or oblige him to quit his prey. He bites cruelly, and always with greater vehemence in proportion as he is less resisted ; for he uses precautions with such animals as attempt to stand upon the defensive. He is cowardly, and never fights but when under a necessity of satisfying his hunger, or of making good his retreat. When he is wounded by a bullet, he is heard to cry out ; and yet, when surrounded by the peasants, and attacked with clubs, he never howls, but defends himself in silence, and dies as hard as he lived.

If he happens to be caught in a pit-fall, he is for some time so frightened and astonished, that he may be killed without offering to resist, or taken alive without much danger. At that instant, one may clap a collar round his neck, muzzle him, and drag him along, without his ever giving the least signs of anger or resentment. At all other times, he has his senses in great perfection. He smells a carcase at the distance of more than a league ; he also perceives living animals a great way off, and follows them a long time upon the scent. Whenever he leaves the wood, he always takes care to go out against the wind. When just come to its extremity, he stops to examine, by his smell, on all sides, the emanations that may come either from his enemy or his prey, which he very nicely distinguishes. He prefers those animals which he kills himself to those he finds dead ; and yet, he does not disdain these, though ever so much infected, when no better is to be had. He is particularly fond of human flesh ; and, perhaps, if he was sufficiently powerful, he would eat no other. Wolves have been seen following armies, and arriving in numbers upon the field of battle, where they devoured such dead bodies as were left upon the field, or but negligently interred. These, when once accustomed to human flesh, ever after seek particularly to attack mankind, choose to fall

fall upon the shepherd rather than his flock, and devour women, carry off their children, &c. These dreadful wolves are called *ware-wolves*, that is to say, wolves of which we ought to be *aware*.

The colour of this animal differs according to the different climates in which it is bred, and often changes even in the same country. Beside the common wolves which are found in France and Germany, there are others with thicker hair, inclining to yellow. In the northern climates, some are found quite black, and some white all over. The former are larger and stronger than those of any other kinds.

THE FOX.] This animal has always been famous for his artifices ; and the reputation he has thus acquired, he partly merits. What the wolf cannot accomplish but by his superior strength, the fox accomplishes by his superior cunning. Without attempting to oppose either the shepherd, his dog, or his flock, he finds an easier way to subsist. Patient and prudent, he waits the opportunity for depredation, and varies his conduct as he perceives that circumstances vary ; and though as indefatigable as the wolf, and more nimble than that animal, he yet does not trust entirely to the swiftness of his course, but contrives for himself an asylum, to which he retires in cases of necessity, and in which, sheltered from danger, he brings up his young.

The fox generally fixes his residence at the edge of a wood, and yet not far removed from some cottage, or some hamlet. He listens to the crowing of the cock, and the cackling of other domestic fowls: even at a considerable distance he scents them, and seizes his opportunity. If he be able to get into the yard, he begins by levelling all the poultry without remorse. This done, he carries off a part of the spoil, hides it at some convenient distance, and again returns to the charge. Taking off another fowl in the same manner, he hides that also, though not in the same place; and this method he practises for several times together, till, warned by the approach of day, or the noise of the family, he finally retires. The same arts are observed when he finds birds entangled in springes laid for them by the fowler; with whom the fox taking care to be beforehand, very expertly snatches the birds out of the snare, conceals them in different places, leaves them there sometimes for two or three days, and is never at a loss to recover his hidden treasure. He is equally alert in seizing the young hares

hares and rabbits, before they have strength enough to escape him ; and when the old ones are wounded and fatigued, he is sure to come upon them in the moments of distress, and to shew them no mercy. In the same manner he finds out the nests of the partridge and the quail, and seizes the mother while sitting.

The fox is so voracious, that, when deficient of better food, he devours rats, mice, lizards, toads and serpents. Insects and shell-fish he is likewise sometimes known to eat. In vain does the hedge-hog roll itself up into a ball to oppose him : this determined glutton teizes it till it is obliged to appear uncovered, and then devours it. The wasp and the wild bee are attacked by him with equal success. Though at first they fly out upon their invader, and actually oblige him to retire, yet this repulse is but for a few minutes, till he has rolled himself upon the ground, and thus crushed such as may have stuck to his skin : he then returns to the charge, and at length, by dint of perseverance, obliges them to abandon their combs, which he greedily devours, both wax and honey.

The young foxes are born blind, like dogs ; like them, too, they are eighteen months or two years in coming to perfection, and live about thirteen or fourteen years. The senses of the fox are as good as those of the wolf ; his sentiment is more acute, and the organ of his voice is more supple, and more perfect. The wolf is never heard but by dreadful howls, while the fox only yelps, barks, and sends forth a moanful sound, resembling the cry of the peacock. His tones, too, are different, according to the different sentiments with which he is affected. He has one sound expressive of desire, another of murmur, another of sorrow, and another of pain : the latter is never heard from him, unless in the instant that he is wounded by a shot, and has lost the use of some member ; for, like the wolf, when attacked with cudgels alone, he never murmurs, but will defend himself with obstinacy, and fight in silence to the last gasp. He bites dangerously, and with such determined fury, that, in order to make him relinquish his hold, ponderous wood, and even iron bars, are necessary.

The flesh of the fox is not so bad as the flesh of the wolf. Dogs, and even men, eat it in autumn, especially if the animal has fed on grapes ; and, in winter, good furs are made of his skin. He sleeps so sound, that, however closely approached, there is no great danger of awaking him. When he only means to rest himself, he stretches



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The Fox p. 133



out his hind legs, and remains flat upon his belly. In this posture he watches for the birds as they perch on the hedges; who no sooner perceive him than they give each other warning of their approaching danger. The jackdaw and the magpie, in particular, often follow him along to the distance of some hundred paces, still towering beyond his reach, and with their cries, and notes of hostility, apprise other animals to beware.

Of all wild animals, the fox is most subjected to the influence of climate; and there are found nearly as many varieties in this species, as in that of any domestic animal. The generality of the French foxes are red; of some, however, the hair is of a greyish cast; and, of all, the tip of the tail is white. In the northern countries we find foxes of all colours.

THE BADGER is a lazy, distrustful, solitary animal, that retires far from the approach of man, and digs a subterranean residence, where it spends, at least, three-fourths of its existence, and never ventures forth but in search of food. It burrows in the ground with particular facility, as its body is rather of an oblong form, and its claws, those especially of the fore feet, are very long and compact. The hole which it thus forms to itself, is often at a very great distance from the surface of the earth, and the passage to it is always oblique and winding.

The fox, who is less expert at such excavations, often appropriates to his own convenience the labours of the badger. Unable to compel him from his retreat by force, it often drives him from it by stratagem, often remains a fixed centinel at the mouth of the passage, disturbs it, and, as an infallible expedient, it is said, emits his ordure. The badger gone, he immediately assumes possession of it, enlarges it, and every way accommodates it to his own purpose. Though forced to remove to another habitation, this animal does not, however, remove to another country. At a little distance from its old burrow, it forms a new one, from which it never stirs but at night. The dogs easily overtake it, when it is at any distance from its hole; and then, using all its strength, all its powers of resistance, it throws itself upon its back, and defends itself with desperate resolution.

Several badgers have been brought to me, and some of them I kept a long time. The young ones are easily tamed; they will play with young dogs, and, like them,

will follow any person whom they know, and from whom they receive their food; but the old ones, in spite of every effort, still remain wild. They are neither mischievous nor voracious, as the fox and the wolf are, yet they are carnivorous; and though raw-meat is their favourite food, yet they will eat any thing that comes in their way, as flesh, eggs, cheese, butter, bread, fish, fruit, nuts, roots, &c. They sleep the greatest part of their time, without, however, being subject, like the mountain-rat, or the dor-mouse, to a torpor during the winter; and thus it is, that, though they feed moderately, they yet are always fat.

Their hole they keep exceedingly clean, nor are they ever known to void their ordure in it. The male is rarely to be found with the female. In summer she brings forth, and her usual number at a birth is three or four. These she feeds at first with her milk, and afterwards with such petty prey as she can surprise. She seizes young rabbits in the warren, robs birds of their young, while yet in the nest, finds out where the wild bees have laid up their honey, where field-mice, lizards, serpents, and grasshoppers, are to be met with; and carries all to her expecting brood, which she frequently brings forward to the mouth of her hole.

These animals are naturally of a chilly temperament. Such as are reared in a house seem to be never more happy than when near a fire. They are likewise very subject to the mange; and, unless carefully washed, the dogs that penetrate into their burrows are seized with the same distemper.

The hair of the badger is always filthy; between the anus and the tail there is an opening, which, though it has no communication with any interior part, and is hardly an inch deep, continually emits an oily liquid. This the animal is fond of sucking. Its flesh is not absolutely nauseous; and of its skin are made coarse furs, collars for dogs, trappings for horses, &c.

THE OTTER is a voracious animal which, more fond of fish than of flesh, is seldom found but at the sides of lakes and rivers. It swims with more facility than even the beaver. All the feet of the otter have membranes; and it can hardly walk faster than it swims.

Accurately considered, the otter cannot be pronounced an amphibious animal. We even find them drowned when they happen to have been entangled in a net; and this evidently

evidently for want of having had time to destroy it, and thereby effect their escape. For want of fish, frogs, water-rats, or other nourishment, it will eat the young branches, and the bark, of aquatic trees; and in spring it will eat new grass. Of cold it is as little afraid as of moisture. It brings forth in the month of March. Three or four is the number generally produced at a birth.

The otter becomes industrious with age, at least enough so to wage a successful war against the tribes of fishes, which, with respect to instinct and sentiment, are greatly inferior to other animals. It does not dig its own habitation, but fixes its residence in the first hole that offers, under the root of the willow or poplar-tree, in the clefts of rocks, and even among piles of floating wood; and there the female brings forth her young. It, however, frequently changes its residence; and drives away, or disperses its young ones at the expiration of six weeks, or two months.

THE MARTIN.] The generality of naturalists have considered the martin and the pine-weasel as animals of one and the same species. They are, however, different both in disposition and temperament. The pine-weasel shuns open countries, confines itself to the bosom of the forest, fixes its residence upon some tree, and is never found in great numbers but in cold climates; while the martin not only approaches human habitations, but even forms a residence for itself in old buildings, in hay-lofts, in holes of walls, and while the species is generally diffused in great numbers over all the temperate climates, it is not to be met with in the regions of the North.

The countenance of the martin is very sharp; its eye is lively, its limbs are supple, its body is flexible, and all its movements are quick. It rather leaps and bounds than walks; and with great facility climbs walls, enters pigeon-houses, and hen-houses, devours the eggs, the pigeons, and the hens, as on other occasions it does mice, rats, moles, and birds in their nests.

This animal, it is said, brings forth as often as the cat. The growth of the young ones is very quick; and hence it may be inferred, that it is an animal whose life does not exceed eight or ten years. Its smell, which is not absolutely disagreeable, is like that of counterfeit musk. Both the martin and the pine-weasel, as well as a number of other animals, have interior vesicles which contain a
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strong-scented substance like that which the civet furnishes.

THE PINE-WEASEL, originally a native of the North, is in a manner peculiar to that climate, where they are so numerous, that the quantity of furs produced from this animal alone, and carried into foreign countries, is actually astonishing. In temperate climates, on the contrary, it is rarely, and in warm climates never, to be found. Some there are in Burgundy, and some in the forest of Fontainebleau; but in general they are as scarce in France as the martin is common. There are none in England, because in that country there are no very extensive woods.

Alike averse to open countries, and to countries which are inhabited, it remains in the bosom of some forest, ranges below through the labyrinths of the thicket, or towers aloft upon the branches of the trees. It subsists by the chace, and destroys a prodigious quantity of birds, whose nests it searches for, and invades, in order to devour the eggs. Of the squirrel, the dormouse, &c. it also makes a prey; and it is known to eat honey as well as the martin.

Its neck is yellow, whereas that of the martin is white; and its hair, at the same time, is much finer, thicker, and less subject to shed.

When the female is near her time, her custom is to climb to the nest of some squirrel, to drive her from it, to enlarge it for her own purpose, and to bring forth her young in it. In the same manner, she occupies the old nests of the owl and the buzzard, as also the hollow places of trees, from which she presently dislodges the woodpecker, and other birds.

THE POLE-CAT is somewhat smaller than the martin; its tail is shorter, its snout sharper, and its hair more thick and more black. It has some white on its forehead, and about the nose and mouth. It differs likewise in its voice; the cry of the martin being rather sharp and loud, that of the pole-cat deeper and more hollow. The pole-cat, however, does not at all resemble the martin in smell, which, in the former, far from being in any degree agreeable, is to the last degree fetid. When heated or enraged especially, it sends forth and diffuses around a stench that is absolutely intolerable. The dogs will not eat its flesh; and even its skin, though good in itself, sells at a very low



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The Hog of Siam
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Ditto



The Pole Cat
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low price, as it can never be entirely divested of its natural odour.

THE FERRET.] It has been doubted by some authors, whether or not the ferret and the pole-cat were animals of two different species. Perhaps, the resemblance there sometimes is in the colour of their hair first gave rise to this uncertainty. The pole-cat, nevertheless, a native of temperate climates, is an animal wild like the martin; whereas the ferret, originally an inhabitant of hot countries, cannot exist in France, unless as a domestic animal. The ferret also, and not the pole-cat, is made choice of to drive the rabbits from their burrows, chiefly because it is more easily tamed. The ferret has a longer and thinner body, a narrower head, and a sharper snout, than the pole-cat. It has not the same sagacity in providing for its subsistence; it cannot exist, at least in our regions, without the care of man, nor have such of the species as have been lost in the burrows of rabbits, been ever known to multiply in the country; but have, on the contrary, perished, to all appearance, by the severity of the winter.

This animal is by nature a mortal enemy to the rabbit. If even a dead one is presented to a young ferret which had never seen one before, it springs at it, and tears it with fury; if it be a living one, it seizes it by the neck and nose, and instantly begins to suck its blood. When the ferret is let loose into the burrows of the rabbits, it is necessary to muzzle him, that he may not kill them at the bottom, but only oblige them to run out, and thereby fall into the net laid for them at the entry. If he is allowed to go unmuzzled, there is a risque of losing him, because, after having sucked the blood of the rabbit, he will fall asleep; and the smoke which is raised at the mouth of the burrow does not always prove a sufficient expedient for bringing him back, as there are often more issues than one, and as one burrow generally communicates with others, in which the ferret is apt to be the more bewildered, the more he is surrounded with the smoke.

THE WEASEL.] The common weasel is as frequent in temperate and in hot countries, as it is scarce in cold ones. Though of the same species, it is in many respects different from the ermine, which is a native of the north.

When a weasel enters a hen-roost, it never meddles with the cocks or the old hens; it makes choice of the pullets,

pullets, the young chickens, and these it kills with a single stroke on the head, and carries away one after another. The eggs it also destroys, and sucks with incredible avidity. In winter it generally resides in some granary, or hay-loft; where the female often continues even in the spring, in order to bring forth her young among the hay or straw. During this time the weasel makes war with the rats and mice with more success than the cat, since, following them into all their holes, it is next to an impossibility for them to escape. It also climbs up to the pigeon-houses, to the nests of sparrows, &c. and commits great havock. In summer, it removes to some distance from the houses, always choosing the lower countries about the mills and streams, hiding itself among the bushes, in order to catch the birds, and not unfrequently taking up its habitation in the hollow of an old willow. The female generally brings forth four or five. The young ones come forth with their eyes shut, but in a little time they attain a sufficiency of growth and strength to follow their mother to the chase. They attack adders, water-rats, moles, field-mice, &c. and, traversing the meadows, devour quails and their eggs.

Like the pole-cat and the ferret, these animals have so strong a scent that they cannot be kept in any place that is inhabited. As their own smell is very bad, they seem to sustain no inconvenience from any foreign stench or infection. A peasant in my neighbourhood took, one day, three weasels newly brought forth, in the carcase of a wolf which had been suspended by its hind-legs from one of the branches of a tree; and though the wolf was almost entirely rotten, the old weasel, nevertheless, brought grass, straw, and leaves, in order to make a bed for her young ones in the cavity of the thorax.

THE ERMINE, OR STOAT.] The weasel with a black tail is called the ermine when it is white, and the stoat when it is red or yellowish. Though it is a less common animal than the weasel, yet there are numbers to be found in the old forests, and sometimes during the winter in the neighbourhood of woody grounds. It is always easy to distinguish it from the common weasel, because the tip of its tail is always of a deep black, while the edge of its ears, and the extremities of its feet are white.

C H A P. XII.

Of certain smaller Animals of the carnivorous Class—The Squirrel—The Rat—The Mouse—The long-tailed Field-Mouse—The Water-Rat—The short-tailed Field-Mouse—The Guinea-Pig—The Hedge-Hog—The Shrew-Mouse—The Water-Shrew-Mouse—The Mole—The Bat—The Fat Squirrel—The Garden-Squirrel, or Greater Dormouse—The Dormouse—The Brown Rat—The Marmot.

THE SQUIRREL is a beautiful little animal, which is only half-wild, and which, by its gentleness, its docility, and even the innocence of its manners, might deserve to be exempted from the present class. It is neither a carnivorous nor an injurious animal, though it sometimes seizes on birds; its general food consisting of fruit, almonds, hazelnuts, beech-mast, and acorns: it is neat, cleanly, alert, lively, and industrious; its eyes are full of fire, its countenance is sharp, its body is nervous, and its limbs are supple.

The beauty of its form is yet heightened by a spreading tail, in shape like a plume of feathers, which it raises above its head, and forms into a kind of shade for itself.

The squirrel may be said to be less a quadruped than almost any other four-footed animal. It generally holds itself almost upright, using its fore-feet as hands for a conveyance to its mouth. Instead of hiding itself in the earth, it is continually in the air: it somewhat resembles the birds by its lightness and activity; like them, it rests upon the branches of trees; leaping from one to the other, and in the highest of them builds its nest. It avoids the water still more than the earth; and it is even asserted of this animal, that, when it is obliged to cross a river or stream, it uses the bark of a tree, or some such light woody substance, as a boat, while its tail supplies the place of sails, and of a rudder. It gathers together a quantity of nuts during the summer, which it deposits in the hollow part of some old tree, and to these has recourse for provision in winter; and such is the agility of its body, that it will, in an instant, climb a beech-tree, let its bark be ever so smooth.

There are many species which approach to that of the squirrel, though there are few varieties in the species itself. Some there are of an ash-colour, and all the others are red

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The small grey squirrel is of a different species, and remains always grey : and, without mentioning the flying squirrels, which are very different from the others ; the white squirrel of Cambaye, which is very small, and has a tail like that of the European squirrel ; that of Madagascar, called *Tsitfibi*, which is grey, and which, as Flaccourt says, is neither handsome nor fit to be tamed ; the white squirrel of Siam ; the grey, and spotted, squirrel of Bengal ; the streaked squirrel of Canada ; the black squirrel ; the large grey Virginian squirrel ; the white-striped squirrel of New Spain, the white Siberian squirrel ; the variegated squirrel ; the little American squirrel ; that of Brasil ; that of Barbary ; the *palmist*, &c. form so many species entirely distinct and separate from that of which we have been treating.

THE RAT.] If we descend by degrees from the great to the small, from the strong to the weak, we shall find, that Nature has uniformly maintained a balance ; that, attentive only to the preservation of each species, she creates a profusion of individuals, and is supported by the numbers which she has formed of a diminutive size, and to which she has denied weapons, strength and courage.

Under the generical name of rat, several species of small animals have been comprised. This name we shall solely appropriate to the common rat, which is of a dark colour, and lives in our houses. Each of the other species shall have its particular denomination ; for, as neither of them couple together, each is, in reality, different from all the rest. The rat is well enough known by the trouble he gives us.

This animal is carnivorous, and even, if the expression is allowable, *omnivorous*. Hard substances, however, it prefers to soft ones : it devours wool, stuffs, and furniture of all sorts ; eats through wood, makes hiding-places in walls, thence issues in search of prey, and frequently returns with as much as it is able to drag along with it, forming, especially when it has young ones to provide for, a magazine of the whole. The females bring forth several times in the year, though mostly in the summer season ; and they usually produce five or six at a birth.

In defiance of the cats, and notwithstanding the poison, the traps, and every other method that is used to destroy these creatures, they multiply so fast as frequently to do considerable damage. In old houses, in the country especially, where great quantities of corn are kept, and where the

the neighbouring barns and hay-stacks favour their retreat, as well as their multiplication, they are often so numerous, that the inhabitants would be obliged to remove with their furniture, were they not to devour each other. This we have often, by experience, found to be the case when they have been in any degree straitened for provisions; and the method they take to lessen their numbers, is, for the stronger to fall upon the weaker. This done, they lay open their skulls, and first eat up the brains, afterwards the rest of the body. The next day, hostilities are renewed in the same manner; nor do they suspend their havock till the majority are destroyed. For this reason it is, that, after any place has for a long while been infested with rats, they often seem to disappear of a sudden, and sometimes for a considerable time.

The female always prepares a bed for her young, and provides them immediately with food. On their first quitting the hole, she watches over, defends, and will even fight the cats, in order to save them. The weasel, though a smaller animal, is, however, a still more formidable enemy than the cat. The rat cannot inflict any wounds but by snatches, and with its fore-teeth, which, however, being rather calculated for gnawing than for biting, have but little strength; whereas the weasel bites fiercely with the force of its whole jaw at once, and, instead of letting go its hold, sucks the blood through the wound. In every conflict with an enemy so dangerous, it is no wonder, therefore, that the rat should fall a victim.

There are many varieties in this species. Beside the common black rat, there are some which are brown, and some almost black; some which are grey, inclining to white or red, and some altogether white. The white rat, like the white mouse, the white rabbit, and all other animals which are entirely of that colour, has red eyes. The white species, with all its varieties, appears to belong to the temperate climates of our continent, and have been diffused in much greater abundance over hot countries than cold ones. Originally they had no rats in America; and those which are to be found there in such numbers at this day, are the produce of rats which accidentally obtained a footing on the other side of the Atlantic with the first European settlers. Of these the increase was so great, that the rat was long considered as the pest of the colonies; where, indeed, it had hardly an enemy to oppose it but the large adder, which swallows it up alive. The European ships

ships have likewise carried these animals to the East Indies, into all the islands of the Indian Archipelago, as well as into Africa, where they are found in great numbers. In the North, on the contrary, they have hardly multiplied beyond Sweden; and those which are called Norwegian and Lapland rats, are animals different from ours.

THE MOUSE is an animal smaller than the rat, as also more numerous, and more generally diffused. Its instinct, its temperament, its disposition, is the same; nor does it materially differ from the rat, but by its weakness, and the habits which it contracts from that circumstance. By nature timid, by necessity familiar, its *fears* and its *wants* are the sole springs of its actions. It never leaves its hiding-place but to seek for food; nor does it, like the rat, go from one house to another, unless forced to it, or commit by any means so much mischief. Its manners are milder; and, to a certain degree, it may be tamed. It is, however, utterly incapable of attachment; and, in fact, how is it possible to love those who are perpetually laying snares for us?

But for its immense fecundity, the species of the mouse could not subsist. Even in mouse-traps I have known them to bring forth. They produce at all seasons, and several times in the year. Their usual number at a birth is five or six; and these, in less than fifteen days, attain growth and strength sufficient to run about and shift for themselves. As in these respects they so soon attain perfection, so the duration of their life must be very short; a circumstance which cannot but heighten our idea of their prodigious multiplication. Aristotle tells us, that, having put a pregnant mouse into a vessel of corn, he soon after found in it no less than one hundred and twenty mice, all sprung from one original.

THE LONG-TAILED FIELD-MOUSE is smaller than the rat, but larger than the common mouse, and does not live in houses. It is remarkable for the largeness and prominence of its eyes; it differs likewise both from the rat and the mouse in the colour of its skin, which, while it is tolerably white under the belly, is of a reddish brown upon the back. The species is generally and abundantly diffused.

It appears, that they are a long time in attaining their full growth, as they vary considerably in size. The largest are rather more than four inches in length, from the tip of the

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the nose to the insertion of the tail ; and the smallest, which appear to be full grown as well as the others, are an inch shorter. As there are found many of different intermediate sizes, however, there is no room to doubt but that the larger and the smaller are all of the same species.

These creatures are fond of dry and elevated grounds. In woods, and in the fields adjoining to them, they are to be found in great numbers. They conceal themselves in holes, which they either find already made, or which they make for themselves, under bushes, or the trunks of hollow trees. In these they amass so prodigious a quantity of acorns, nuts, &c. that in one single hole there has been found a bushel at a time ; and this provision, instead of being proportioned to the wants of the animal, is only so to the capacity of the place allotted for its reception. These holes are generally more than a foot under ground, and often divided into two cells, of which the one serves for an habitation for itself and its young ones, and the other for a granary. I could never hit upon any other method of preventing their ravages, than that of setting traps at every tenth pace through the whole extent of each piece of new-sown land. There wants no other bait than a roasted nut laid under a flat stone, which is to be supported by a small bit of wood. This they will eagerly attempt to seize ; and, being fixed to the wood, no sooner do they touch it than the stone falls upon them, and stifles or crushes them to death.

THE WATER-RAT is a little animal, about the size of a common rat, but in its nature and habits rather resembling the otter than the rat. Like the otter, it frequents the fresh waters, and is generally found on the borders of rivers, rivulets and ponds ; like that creature, too, it seldom feeds but upon fish, or the spawn of fish, though sometimes it eats frogs, water-insects, and even roots and herbs. This animal is not web-footed ; but, though every toe of its feet is separated, it swims with facility, keeps itself a long time above water, and thence carries off its prey, in order to eat it when got to land, either on the grass, or in its hole.

The head of the water-rat is shorter, the nose broader, the hair more erect, and the tail much longer than that of the land-rat. Like the otter, it flies from large rivers, or rather from those which are too much frequented, and is never found either in houses or in barns.

It is probable, that these animals bring forth often in a year; but of this we have no certain information. Their flesh is not absolutely bad; and, in Catholic countries, the peasants eat it during Lent, as they do that of the otter. The species is to be found throughout Europe, the very extremities of the North excepted.

THE SHORT-TAILED FIELD-MOUSE is still more common, more generally diffused than the long-tailed kind, and is found almost every where; in woods, in meadows, and even in gardens. It is remarkable for the thickness of its head, and the shortness of its tail, which is not above an inch in length. It forms holes in the earth, where it hoards up corn, nuts, and acorns; though the former of these it seems to prefer to every other kind of aliment. About the month of July, when the corn begins to ripen, they flock together from all sides, and frequently do great damage, by cutting the stalk in order to come at the ear. In autumn and winter, the greater part of them withdraw into the woods, where they find beech-mast, nuts and acorns. Some years they appear in such great numbers, that they would destroy every thing, were they to subsist for any length of time. For want of other food, however, they often destroy and eat one another, and are themselves the usual prey of the fox, the wild-cat, the martin, the weasel, and of the long-tailed field-mouse.

THE GUINEA-PIG, though originally a native of the warm climates of Brasil and Guinea, lives, however, and breeds in temperate and even in cold countries, provided it is properly taken care of. Its skin is of little or no value; and the flesh, though people may, and actually do eat it, is very indifferent food; a circumstance which might, in some measure, be removed, were they to be reared in warrens, where they might have air, space to range in, and a proper choice of herbs. Those which are kept in houses have nearly the same taste as the house-rabbit; and of those which have passed the summer in a garden, the taste is less disagreeable, but is still insipid.

The growth of these animals is not entirely completed till the expiration of eight or nine months; though indeed it is in apparent bulk and fat that they chiefly increase till then, the developement of the solid parts being finished before the age of five or six months. The female never goes with young above three weeks; and she has been known to bring

bring forth when only two months old. The first litter is not so numerous as the subsequent litters. It does not amount to more than four or five; the second amounts to five or six, and the rest to seven or eight, and even to ten or eleven. She does not suckle her young longer than twelve or fifteen days. Thus these animals produce at least every two months; and as those which are newly born produce in the same manner, their multiplication is astonishing. In one year a thousand might be obtained from a single couple, did they not frequently destroy each other, and perish from the cold and wet.

The guinea-pig feeds on all sorts of herbs, and especially on parsley, which it prefers even to bran, flour, or bread. Of apples and other fruits it is also exceedingly fond. Like the rabbit, it eats precipitately, little at a time, but very often. It grunts somewhat like a young pig.

These animals are so delicate, that it is with difficulty they undergo the rigours of winter. When they feel the cold, they assemble together, press close to one another, and in this situation are frequently found dead.

THE HEDGE-HOG has the power of defending itself from an enemy without combating him, and of annoying without attacking him. Possessed of little strength, and of no agility, by which it might escape its foes, it has received from Nature a prickly armour, with a facility of rolling itself up in a ball, and of presenting from every part of its body a poignant weapon of defence. Even from its fear this animal obtains another engine of security; the smell of its urine, which, when attacked, it generally sheds, being sufficient to disgust its enemy with the contest, and to keep him at a distance. Thus the generality of dogs are content with barking at the hedge-hog, when it falls in their way, without discovering any inclination to seize it. Of these, however, there are some which, like the fox, have had the address to master it, though of the martin, the pole-cat, the ferret, the weasel, or any of the birds of prey, it has no dread.

When at large in the country, they are generally found in woods, under the trunks of old trees, as also in the clefts of rocks. I do not believe that they climb up trees, as some naturalists have affirmed, or that they make use of their prickles to carry off the fruit: it is with their mouth they seize it; and though they are very numerous in our forests, yet I have never seen one of them upon a tree. They

always remain at the foot, in some hollow space, or under moss. They remain in a state of inactivity all day; they only venture abroad by night, and seldom approach human habitations. They sleep during the winter; and therefore every thing that has been said of their laying up provisions for that season must be false. They at no time eat much, and can subsist very long without any food whatever. Like that of all other animals which become torpid in winter, their flesh is not proper for food; nor is their skin any longer converted to the smallest use.

THE SHREW-MOUSE seems to form a shade in the order of small animals, and to fill up the vacuum between the rat and the mole. The shrew-mouse is smaller still than the domestic mouse, resembles the mole in its snout, which is longer than its jaw-bones; in its eyes, which, though rather larger than those of the mole, are, however, in like manner concealed, and much smaller than those of the domestic mouse; in the number of its claws, of which it has five to each foot; in its tail, and its legs, particularly the hind ones, which are shorter than those of the domestic mouse; and, lastly, in its ears, and in its teeth.

This diminutive creature has a strong smell, which is peculiar to itself, and so offensive to cats, that, though they will cheerfully chase and kill the shrew-mouse, they yet will not eat its flesh like that of the domestic mouse. It is evidently this noisome odour, this aversion of the cat to it, that gave rise to the notion, that the shrew-mouse is a venomous animal, and that its bite is so dangerous to cattle of all sorts, and particularly to horses. The truth, however, is, that it is neither venomous nor capable of biting; for it cannot open its mouth sufficiently wide to seize the double thickness of the skin, which is absolutely necessary, in order to bite. The distemper among horses, it is farther to be observed, which the vulgar attribute to the tooth of the shrew-mouse, is a swelling which proceeds from an internal cause, and has no connection with any bite, or rather scratch, that this little animal may give.

In winter especially, the shrew-mouse generally fixes its residence in some hay-loft, stable, or barn, where it feeds on grain, insects, and putrefied flesh. It is likewise found in woods and fields, where, living on corn, it sometimes conceals itself under moss or leaves, sometimes under the trunks of trees, sometimes in holes abandoned by moles, and sometimes in holes of a smaller size, which it forms for itself by digging with its claws and snout.

The shrew-mouse produces, it is said, as many at a birth as the domestic mouse, though less frequently. It has a squeak much more sharp and piercing than the latter. In point of nimbleness, however, it is far inferior; and as it both sees imperfectly, and runs slowly, there is little difficulty in taking it.

The usual colour of these creatures is brown with a mixture of red; others of them there are ash-coloured; and in all there is a greater or less degree of whiteness upon the belly. They are very common throughout Europe; but they do not seem to have obtained a footing in America.

THE WATER SHREW-MOUSE, though a native of these regions, was yet unknown to any of our naturalists till M. Daubenton first discovered it. Every thing necessary to be added here, with respect to the *water shrew-mouse*, is, that it is taken at the sources of fountains, in the morning and evening, as the sun rises and sets; that in the day-time it remains concealed in the clefts of rocks, or in holes under ground, near the edges of rivulets; that it brings forth in spring, and commonly produces nine young ones at a time.

THE MOLE, without being blind, has such small eyes, and these so concealed, that it can make little use of the sense of seeing. In recompence, however, it enjoys the senses of hearing and feeling in an eminent degree. Its skin is soft as silk; and its little paws, which are furnished with five claws, are very different from those of other animals, and almost like the hands of a human being. Proportioned to the size of its body, its strength is great; it possesses the mild habitudes of repose and of solitude; the art of securing itself, of forming, instantaneously, as it were, an asylum to itself, of extending it, and of obtaining, without the necessity of relinquishing it, an abundant subsistence.

The mole shuts up the entry to its retreat, which it seldom deserts, unless forced to it by heavy rains in summer. It is fond of cultivated grounds, and is never to be found in those which are either muddy, hard, compact, or stony. It requires a soft soil, well supplied with esculent roots, and with insects and worms, of which, indeed, its principal nourishment consists.

As these animals very seldom come above ground, they have but few enemies; and very readily evade the pursuit of animals stronger and swifter than themselves. The chief calamity which befalls them is an inundation; and when this happens, they are seen in numbers attempting to save themselves by swimming, and using every effort to reach the higher grounds. The greatest part, however, perish, as well as their young, which remain in the holes behind. Were it not for such accidents, from their great fecundity, they would become extremely troublesome. They generally have four or five at a time; and it is easy to distinguish among other mole-hills, that in which the female has brought forth her young. These are made with much greater art than the rest; and are usually larger and more elevated. I am apt to think that they produce oftener than once a-year. Of this I am certain, that new-born moles are found from the month of April to the month of August; a circumstance which, however, may be owing to their having been engendered and brought forth sooner or later in the year.

The hole in which they produce their young is formed with singular skill, and deserves a particular description. The female begins by erecting the earth into a tolerably spacious apartment, which is supported within by partitions at proper distances, that prevent the roof from falling. All round this she works, and beats the earth very firm, so as to make it capable of keeping out the rain, let it be ever so violent. As the hillock, in which the apartment is thus formed, is raised above ground, the apartment itself is consequently above the level of the plain, and therefore less subject to accidental slight inundations. The place being thus fitted, she procures grass and dry leaves, as a bed for her young. There they lie secure from wet, and she continues to make their retreat equally free from danger; for all round this hill of her own raising, are holes running into the earth, which part from the middle apartment, like rays from a center, and extend about fifteen feet in every direction. These resemble so many walks or chaces, into which the animal makes her subterraneous excursions, and supplies her young with such roots or insects as she can provide: but they contribute still more to the general safety; for as the mole is very quick of hearing, the instant she perceives her little habitation attacked, she takes to her burrow, and unless the earth be dug away by several men at once, she and her young always make good a retreat.

Some

Some authors have said, but without foundation, that the mole and the badger sleep the whole winter. That this is not true of the badger, we have already observed; and as a proof that this animal quits its hole in winter as well as in summer, we have only to view the traces it leaves upon the snow. As for the mole, so far is it from sleeping during the winter, that it continues its subterranean operations then as well as in summer; and the peasants of France even proverbially remark, that "when the moles are at work, a thaw is at hand." They are indeed fond of warm places; and the gardeners often catch them round their beds in the months of December, January, and February.

THE BAT.] An animal, which, like the bat, is half-quadruped and half-bird, and which, in fact, is neither the one nor the other, is a kind of monster. In the bat, the fore-feet are, properly speaking, neither wings nor feet, though the animal uses them for the purpose of flying, and occasionally of moving along upon the ground. They are, in fact, two shapeless extremities, of which the bones are of a monstrous length, and connected by a membrane, uncovered with feathers, or even with hair, like the rest of the body: they are a kind of winged paws, of which we only see one claw about the length of an inch, and of which the other four claws, though very long, cannot act but in conjunction, and have no peculiar movements, no separate functions; they are a kind of hands ten times larger than the feet, and, in all, four times longer than the whole length of the body of the animal; they are, in a word, parts which have rather the appearance of a capricious and accidental, than a regular and determined production.

To these incongruities, these disproportions of the body and members, may be added the still more striking deformities of the head. In some species, the nose is hardly visible, the eyes are sunk near the tip of the ear, and are confounded with the cheeks; in others, the ears are as long as the body, or else the face is twisted into the form of an horse-shoe, and the nose covered with a kind of crust. Averse, likewise, to the society of all other creatures, they shun the light, inhabit none but dark and gloomy places, to which, after their nocturnal excursions, they are sure to return by break of day, and in which they remain, fixed, as it were, to the walls till night again approaches.

Their motion in the air is with less propriety to be termed a flight, than a kind of uncertain flutter, which they seem to execute by struggles, and in an awkward manner. They raise themselves from the ground with difficulty, never soar to a great height, and are but imperfectly qualified to accelerate, or even to direct, their flight. This, far from being either rapid, or very direct, is performed by hasty vibrations in an oblique and winding direction; and in passing along they do not fail to seize all the gnats, moths, and other nocturnal insects that come in their way. These they swallow entire; and in their excrements we meet with the remains of wings and the other dry parts, which they have not been able to digest. Like quadrupeds, the bat brings forth its young alive, and like them it has teeth and nipples.

It is affirmed that these animals do not produce more than two at a birth, and that these they suckle, and even carry along with them as they fly. They unite in numbers to defend each other from the cold; they pass the winter without awaking, without stirring, and without eating, from the end of autumn till spring. Though they can more easily support hunger than cold, and can even subsist a number of days without food, they yet belong to the number of carnivorous animals; for, when opportunity serves, they will devour bacon, and meat of all kinds, whether raw or roasted, whether fresh or corrupted.

THE FAT SQUIRREL.] Of this animal we know three species, which, like the marmot, sleep during the winter; namely, the fat squirrel, the garden squirrel, and the dormouse. Many authors have confounded these species together, though they are all three very different, and of consequence easily known and distinguished.

The fat squirrel is nearly of the size of the common squirrel, and, like it, its tail is covered with long hair. It is without propriety that these animals have been said to sleep during the winter. They are not in a state of natural sleep at this period; they are in a torpor, which is produced by the coldness of the blood, and by which they lose the use of their members and senses. Their internal heat is indeed so small, that it hardly exceeds that of the temperature of the air. When the heat of the air is at ten degrees above the freezing point of the thermometer, the heat of these animals is also at ten degrees. Now it is well known, that the internal heat of man, and of the
generality

generality of animals exceeds at all times thirty degrees; and therefore there is little reason to wonder why these animals, so inferior comparatively to all others in point of heat, should become torpid as soon as their own little quantity of internal heat ceases to be assisted by the external heat of the air; a circumstance which naturally happens when the thermometer is not more than ten or eleven degrees above congelation. This is the real cause of the torpor of these animals; a cause of which naturalists have not been apprised, and which, nevertheless, extends to all animals that sleep during the winter.

This torpor continues as long as the cause which produces it continues, and ceases when the cold ceases. A few degrees of heat above the tenth or eleventh degree are sufficient to re-animate these creatures; and if they are kept in a very warm place during the winter, they do not become torpid at all.

Though in this torpid state, they are without the smallest motion, though their eyes are shut, and they seem to be deprived of all use of the senses, they yet feel pain when it is very acute. This they testify by a movement of contraction, as also by a little hollow cry, which they even repeat several times. I am inclined to believe, that it is not from a too great waste of substance that they perish in long winters, since in autumn they are excessively fat, and on their reviving in spring, they are found to have still remained so; this abundance of fat being an internal nourishment which is sufficient to support them, and to supply what they lose by perspiration.

The flesh of the fat squirrel is not unlike that of the guinea-pig. They were considered as a dainty by the Romans, who reared great numbers of them. Like the common squirrel, this animal lives in forests, climbs to the tops of trees, and leaps from branch to branch. This it does less nimbly indeed than the squirrel, whose legs are longer, whose belly is by no means so big, and which is remarkable for being meagre. Nuts, however, and other wild fruits, form its usual nourishment. It likewise eats little birds which it takes in the nests. It does not, like the squirrel, nestle in the upper parts of trees, but makes a bed of moss for itself in the trunks of those which are hollow. It also shelters itself in the clefts of rocks, and always shews a preference for dry places. It avoids moisture, it drinks little, rarely descends to the ground, and, unlike the squirrel, which is easily tamed, remains always wild.

wild. The species is very generally diffused, but there are few or none of them in England.

THE GARDEN SQUIRREL, OR GREATER DORMOUSE.] The fat squirrel frequents the forests, and seems to shun our habitations; the garden squirrel, on the contrary, inhabits our gardens, and is sometimes to be found in our houses. The species of the latter is also more numerous, and more generally diffused.

These animals nestle in the holes of walls, climb up trees, choose the best fruits, and gnaw them as they begin to ripen. They climb up pear, apricot, and other trees; and in a scarcity of other fruit, they eat almonds, nuts, and even leguminous roots. These they carry in great quantities to their holes, where they make a bed of herbs, moss, and leaves. The cold stupefies, the heat revives them; and sometimes there are eight or ten found in one place, all in a state of torpor, all huddled together, and rolled up in a ball, in the midst of their hoard of provisions. Their flesh is not eatable, and has even the disagreeable smell of the house-rat.

This animal is to be found in all the temperate climates of Europe, and even in Poland, and in Prussia; but it does not appear that there are any in Sweden, or in any of the more northern countries.

THE DORMOUSE.] Of all the rat species, the dormouse is the least ugly. Its eyes are sparkling, its tail is tufted, and its hair is rather fair than red. It never lives in houses, is seldom to be found in gardens, but chiefly frequents the woods, where it finds a shelter in the hollow of some old tree.

The species is by no means numerous, yet they seem to be tolerably common in Italy, and to be not unknown even in the northern climates; but it does not appear to be an English animal; for Ray, who had seen it in Italy, observes, that the small dormouse which is found in England, is not red upon the back like the Italian, and that it probably belongs to another species.

The dormouse becomes torpid by the cold, and rolls itself up in a ball; it revives in mild weather, and hoards up nuts and other dry fruits for future sustenance. It forms its nest in trees, like the squirrel, though generally in a lower situation, among the branches of a nut-tree, in a bush, &c. The nest is composed of herbs interweaved,

is about six inches in diameter, has no aperture but at the top, and contains three or four young ones.

THE BROWN RAT is both stronger and more mischievous than the black rat; it has a reddish skin, a long tail without hair, the back-bone arched like that of the squirrel, the body much thicker, and whiskers like those of a cat. It is considerably within half a century since this species has been spread in the neighbourhood of Paris. They multiply indeed prodigiously, since it is well known that they generally produce twelve or fifteen, often sixteen, seventeen, eighteen, and even nineteen young ones at a time. The males are larger, stronger, and more mischievous than the females. When any one pursues, and endeavours to take them, they will turn again, and bite the hand or stick which touches them. Their bite is not only sharp but dangerous, and is immediately followed by a considerable swelling; and the wound, though small, is yet long in being closed. They bring forth three times in a year, the dams previously preparing a bed for their young; and thus two individuals of this species produce at least three dozen in the space of twelve months.

The brown rat in its nature, and some of its habitudes, bears a resemblance to the water-rat. Though there is no place in which they will not fix their residence, they yet seem to delight in living near the water. When they find themselves pursued, and have the same opportunity of sheltering themselves in the water, or in a thorny thicket, they prefer the former, plunge into it without dread, and swim with amazing facility. This particularly happens when they cannot get back to their burrows; for they always dig holes for themselves in the earth, or else occupy those of the rabbit. They may also be taken, like that animal, by means of the ferret, which follows them under ground in the same manner as it does the rabbit, and seemingly with even more ardour.

These animals live principally upon fruit and corn, but are, notwithstanding, exceedingly carnivorous. They devour young rabbits, partridges, and other birds; and when they enter a hen-roost, they destroy, like the pole-cat, more than they can eat. They do not become torpid in the winter, like the dormouse, but take advantage of every fine day to come out of their subterranean mansions. Those which live in barns drive away the mice; and it has even been remarked, that the black rats, as they are called,
have

have been far less common since the brown rats became so numerous.

THE MARMOT, when taken young, is more capable of being tamed than any other wild animal, and nearly as much so as our domestic ones. It will easily learn to perform feats with a stick, to dance, and in every thing to obey the voice of its master. It has a great antipathy to the dog; and when it becomes familiar in a house, and is sure of being supported by its master, it will, in his presence, attack the largest dogs, and boldly fasten upon them with its teeth. Though this creature is not quite so large as a hare, it is yet of a more squat make, and has great strength joined to great agility. It has four teeth in the front of the jaw, which are long and strong enough to inflict a terrible wound; and yet, unless provoked to it, it neither attacks dogs, nor does mischief to any creature whatever. If care be not taken, however, it will gnaw the furniture of an house, and will even make holes through wooden partitions.

As the marmot has very short thighs, and the toes of its paws are formed much like those of the bear, so it often sits erect, and walks with ease, like that animal, upon its hind feet. With its fore-paws it carries its food to its mouth, and eats in an upright posture like the squirrel. It runs much swifter up hill than down; it climbs trees, and runs up the clefts of rocks, or the contiguous walls of houses, with much facility; so much, indeed, that it is ludicrously observed of the Savoyards, who are the general chimney-sweepers of Paris, that they have learned their trade from the marmot.

These animals eat indiscriminately of whatever is given them, whether it be flesh, bread, fruits, herbs, roots, pulse, or insects. Of milk and butter, however, they are particularly fond; and though less inclined to petty thefts than the cat, they are yet never better pleased than when they obtain access to the dairy.

There seems to be a combination of the bear and the rat in the form of the marmot. Its nose, its lips, and the form of its head, are like those of the hare; it has the hair and claws of the badger, the teeth of the beaver, the whiskers of the cat, the paws of the bear, with a tufted tail and short ears. The colour of its hair on the back is reddish brown. On the belly it is reddish, but softer and shorter. Its voice resembles that of a little dog, when it



The Guinea Pig

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The Squirrel

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The Bat p. 151



The Bat as it flies



The Mole p. 149



The Surmolot

is played with or caressed; but when it is irritated or frightened, it raises a loud and shrill cry, highly offensive to the ear. The marmot is a very cleanly animal. In autumn particularly it is loaded with fat, though all the parts of the body are never equally so. The marmot, would be tolerable food, did it not constantly retain somewhat of a disagreeable smell.

This animal, which delights in the regions of ice and snow, and is never found but on the highest mountains, is, nevertheless, most liable to be benumbed by the cold. From the end of September, or the beginning of October, the marmot generally retires to its hole, and appears not again till about the beginning of April. The place of its retreat is formed with precaution, and furnished with art. It is rather wide than long, and very deep, so that it is capable of containing several, without being under a necessity of crowding each other, or injuring the air they breathe. Their feet and claws are formed as if they were designed to dig; and, in fact, they burrow into the ground with amazing celerity, scraping up the earth, and throwing back what they have loosened behind them constantly as they proceed. Still more wonderful is the form of their hole; it resembles the letter Y, the two branches having each an opening that conducts into one channel, which terminates in their general apartment at the bottom. As the whole is contrived on the declivity of a mountain, there is no part of it on a level but the apartment at the end. One of the branches, or openings, issues out sloping downward; and this serves as a kind of sink, or drain, for the whole family, in which they void their excrements, and through which the moisture of the place finds an easy passage. The other branch, on the contrary, slopes upward, and serves them as a door to go in and out. The apartment at the end is warmly lined with moss and hay. It is even asserted, that this is a public work; that some cut the finest grass, others pile it up, and others take their turns to convey it to the hole. Upon this occasion, it is added, one of them lies upon its back, permits the hay to be heaped upon its belly, keeps its paws upright to make greater room, and in this manner, remaining still upon its back, is dragged by the tail, hay and all, to their common retreat. This practice some assign as a reason for the hair being generally worn away from their backs. However another, and perhaps a better reason may be given for this appearance; namely, their inhabiting cells under ground, and being constantly employed in digging up the earth.

Whenever

Whenever they venture abroad, one is placed as a centinel, sitting on an elevated rock, while the others amuse themselves in the fields below, or are employed in cutting grass, and making it into hay for their future convenience; and no sooner does their trusty centinel perceive a man, an eagle, a dog, or any other enemy, than he gives notice to the rest by a kind of whistle, and is himself the last that takes refuge in the cell.

They make no provision for the winter, foreseeing, probably, that such a precaution would be useless. But when they perceive the first approaches of the season in which their vital motions are to continue in some measure suspended, they labour very diligently to close up the apertures of their dwellings, which they effect with such solidity, that it is more easy to open the earth any where else than where they have closed it. They are at that time very fat, and some of them are found to weigh twenty pounds. In this plight they continue for three months longer; but by degrees their flesh begins to waste, and they are quite thin by the end of winter. When their retreat is discovered, they are found each rolled into a ball, and covered with hay. In this state they seem entirely lifeless; they may be taken away, and even killed, without their testifying any sense of pain; and those who find them in this manner, carry home the fat ones for food, and the young ones for breeding up and taming. The marmot produces but once a year, and the litter generally consists of three or four. Their growth is quick, and they live only nine or ten years. They are found in the Alps, Appenines, Pyrenees, in the highest mountains of Germany, in Poland, and in Canada, with a few variations.

C H A P. XIII.

Of carnivorous animals continued—The Bear—The Beaver—The Raccoon—The Coati—The Agouti.

THE BEAR.] THERE is no animal more generally known than the bear, and yet there is none concerning which more differences and contradictions have been found among the writers of natural history. These uncertainties have arisen from their not distinguishing properly the different species. The land-bear must be distinguished from the sea-bear, which is commonly known by the name of the white, or Greenland bear; and the land-bears must again be divided into two classes, the brown, and the black. There are also white land-bears found in Tartary,



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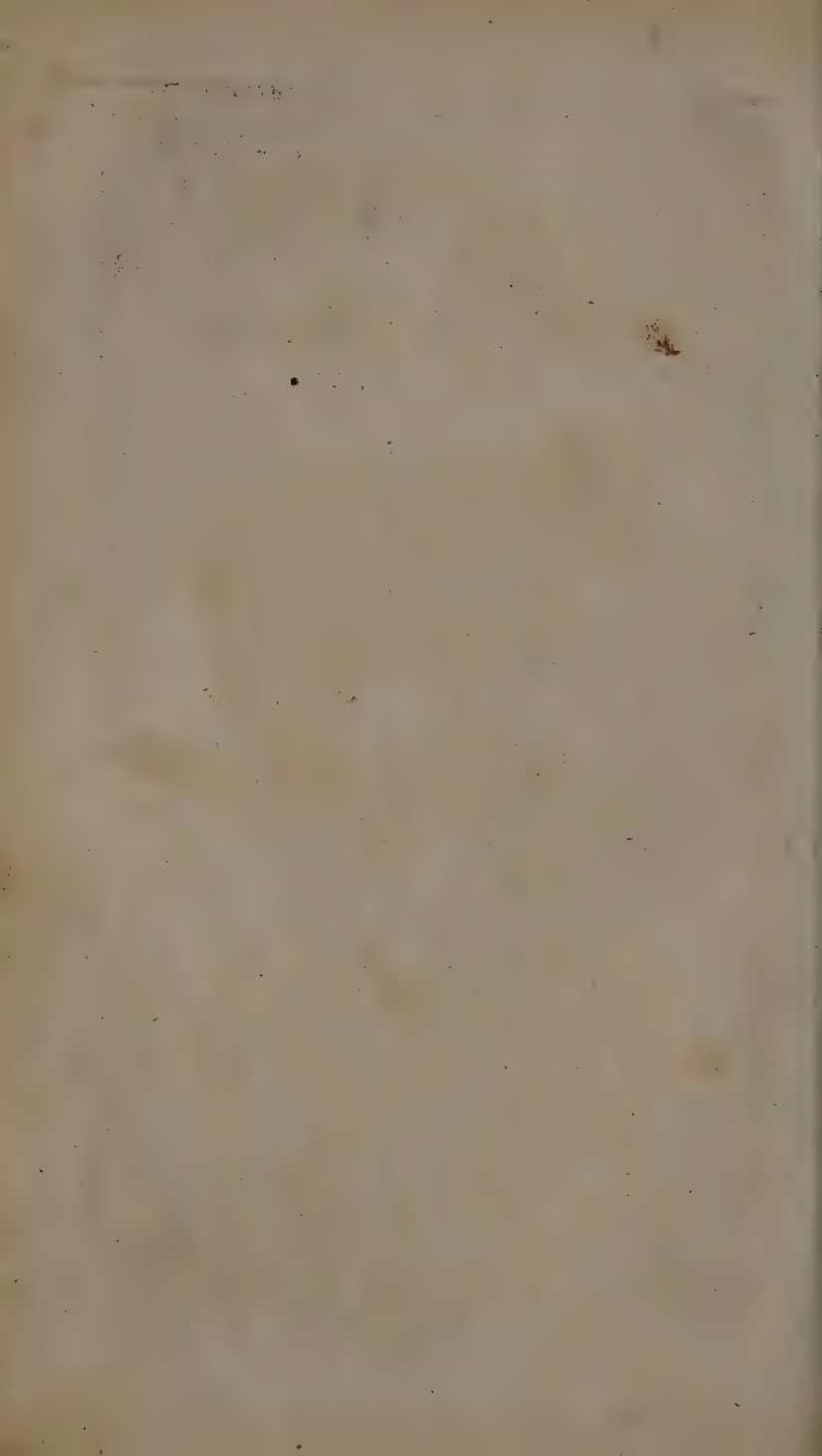


The Brown Bear p. 158



The White Bear

p. 158



Tartary, Russia, &c. which, though they resemble the sea-bear in colour, differ from it, however, in every other particular. It is not the rigour of the climate that makes them white in winter, like the hares and ermines; they are brought forth white, and remain so all their lives. There are also found bears whose skins are a mixture of brown and black, which denotes an intermediate species between the white land-bear, and the brown or black bear.

We meet with the brown bear very frequently, and with the black bear very rarely, on the Alps. In the forests of the northern countries of Europe and America, on the contrary, the black bear is very common. The former is both fierce and carnivorous; the latter is only fierce, and constantly refuses to eat flesh.

The bear is not only a savage, but a solitary animal; he takes refuge in the most unfrequented parts, and the most dangerous precipices of uninhabited mountains. He chooses his den in the most gloomy parts of the forest, in some cavern that has been hollowed by time, or in the hollow of some old enormous tree. Thither he retires alone, and passes a part of the winter without provisions, or without ever stirring abroad. He is not, however, entirely deprived of sensation, like the dormouse, or the marmot, but seems rather to subsist upon the exuberance of his former flesh, and only feels the calls of appetite, when the fat he had acquired in summer begins to be entirely wasted.

When this happens, which, we are told, it generally does at the expiration of forty or fifty days, the male forsakes his den; but the female remains confined for four months; by which time she has brought forth her young. That the latter should not only be able to subsist, but even to nurse their offspring, without receiving themselves any food for such a length of time, is, I think, highly improbable. When with young, however, it is allowed that they are exceedingly fat, as also, that, being covered with a very thick coat, sleeping the greatest part of their time, and giving themselves no exercise or motion, they must necessarily lose very little by perspiration.

Though the males of the brown species devour their newborn little ones, when they find an opportunity for it, yet the females seem, on the contrary, to love them with a ferocious distraction. When once they have brought forth, their fury is more violent, as well as more dangerous, than that of the males. Before the young leave the womb, their formation is perfect; and if either the foetus of the bear, or the bear when newly born, appears, at the first glance, un-

formed,

formed, it is merely because there is a want of proportion in the body and members even of the grown bear, and because, which is well known to be the case in all animals, the foetus, or the new-born animal, is always more disproportioned than the grown animal.

The voice of the bear is a kind of growl, a harsh murmur, which, when enraged especially, is heightened by a clashing of the teeth. Highly susceptible of anger, that anger is always furious, and often capricious. However mild he may appear before his master, and even obedient when tamed, he ought still to be distrusted, still treated with circumspection; nor, on any account, must he be struck on the tip of the nose, or touched on the parts of generation.

This animal is capable of some degree of instruction. There are few who have not seen him stand on his hind legs, or with these dance in rude and awkward measure, to tunes either sung or played on an instrument. But, even in thus tutoring him, it is necessary, in order to succeed, that the animal should be taken young, and held in constraint ever after. The bear which has passed his youth, is not to be tamed, nor even held in awe, and shews himself, if not intrepid, at least fearless of danger.

The wild bear turns not from his path, nor offers to shun the sight of man; and yet, it is said, by a certain whistle he may be surpris'd, and so far charmed as to stop, and stand upon his hind feet. This is the time to shoot, or by one method or other to destroy him; for, when only wounded in an attack, he darts with fury at his foe, and, clasping him with his fore paws, is sure to stifle or strangle him, unless immediate assistance be given.

The bear enjoys the senses of seeing, hearing, and feeling, in great perfection; and yet, compared with the size of his body, his eye is very small; his ears are also short, his skin is coarse, and his hair very thick. His smell is exquisite; more so, perhaps, than that of any other animal, the internal surface of his nose being very extensive, and excellently calculated to receive the impression of smells. He strikes with his paws as a man strikes with his fists; but in whatever particulars he may bear a rude kind of resemblance to the human species, he is only rendered the more deformed by them; nor do they give him the smallest superiority over other animals.

THE BEAVER.] In all countries, as man is civilized and improved, the lower ranks of animals are depressed and degraded. Either reduced to servitude, or treated as rebels,
all

all their societies are dissolved, and all their united talents rendered ineffectual. Their feeble arts quickly disappear; and nothing remains but their solitary instincts, or those foreign habitudes which they receive from human education.

The beaver seems to be now the only remaining monument of that kind of intelligence in brutes, which, though infinitely inferior, as to its principle, to that of man, supposes, however, certain common projects, certain relative ends in view, projects which, having for their basis society, in like manner, suppose some particular method of understanding one another, and of acting in concert.

It is allowed, that the beaver, far from having an absolute superiority over the other animals, seems, on the contrary, to be inferior to some of them as to its qualities merely as an individual; and this fact I have an opportunity to confirm, having, for near a twelvemonth past, had a young beaver in my possession, which was sent to me from Canada in the beginning of the year 1758. It is an animal tolerably mild, tranquil and familiar, though rather, it would seem, gloomy and melancholy. If we consider this animal, therefore, in its dispersed and solitary state, we shall find, that, as to internal qualities, it is not superior to other animals; that it has not more ingenuity than the dog, more sense than the elephant, or more cunning than the fox. It is rather remarkable for the singularities of its external conformation than for any apparent superiority of its internal qualities. Of quadrupeds, the beaver alone has a flat oval tail, covered with scales, which serves as a rudder to direct its motions in the water. It is the only quadruped that has membranes between the toes on the hind feet, and at the same time none on the fore ones, which it uses as hands in carrying food to the mouth. It is the only one which, while it resembles a terrestrial animal in its fore parts, seems to approach the nature of an aquatic being in its hind ones.

The beavers begin to assemble in the month of June or July, in order to form a society, which is to continue for the greatest part of the year. They arrive in numbers from every side, and presently form a company of two or three hundred. The place of meeting is commonly the place where they fix their abode; and this is always by the side of some lake or river. If it be a lake in which the waters are always upon a level, they dispense with building a dam; but if it be a running stream, which is subject to floods and falls, they then set about building a dam, or pier, that crosses the river, so as to form a dead water in that part which lies above and below. This dam, or pier, is often four-score or

an hundred feet long, and ten or twelve feet thick at the base. If we compare the greatness of the work with the powers of the architect *, it will appear enormous; but the solidity with which it is built, is still more astonishing than its size. The part of the river over which this dam is usually built, is where it is most shallow, and where some great tree is found growing by the side of the stream. This they pitch upon as proper for making the principal part in their building; and, though it is often thicker than a man's body, they yet instantly set about cutting it down. For this operation they have no other instrument but their four incisive teeth, which soon lay it level, and that also on the side they wish it to fall, which is always across the stream. They then set about cutting the top branches, to make it lie close and even, and serve as the principal beam of their fabrick.

These operations are performed in common. At one time a number of beavers are employed together at the foot the tree in gnawing it down; and, when this part of their labour is accomplished, it becomes the business of others to sever the branches, while a third party are engaged along the borders of the river, or lake, in cutting other trees, which, though smaller than the first tree, are yet as thick as the leg, if not the thigh, of a common-sized man. These they carry with them by land to the brink of the river, and then by water to the place allotted for their building; where, sharpening them at one end, and forming them into stakes, they drive them into the ground, at a small distance from each other, and fill up the vacant spaces with pliant branches. While some are thus employed in fixing the stakes, others go in search of clay, which they prepare for their purpose with their tails and their feet, and with which, brought home in large quantities, they render their structure still more compact.

This structure is so ingeniously contrived, that it has not only all the extent, and all the solidity, which are requisite, but also a form the most proper for confining the water, and, when it has passed its bounds, for maintaining its weight, or baffling its attacks. At the top of their dike or mole, that is, at the part where it is least thick, they form two or three openings. These they occasionally enlarge or contract, as the river occasionally rises or falls; and when,

* The largest beavers weigh from fifty to sixty pounds, and, in length, are little more than three feet from the tip of the snout to the insertion of the tail.

from inundations either too powerful or too sudden, their works have been damaged; with the utmost diligence and application they are, on the retreat of the waters, immediately repaired.

After this display of their labours to accomplish a public work, it would be superfluous to add to it a description of their private constructions, were it not that, in history, an account should be given of every fact, and that, in this first grand work of the beaver, the intention uniformly was, that the little habitation of each family should be rendered more commodious:

This habitation is always furnished with two passages; one for the purpose of a land, and the other of a water excursion. In shape it is almost always either oval or round; sometimes it is from four to five feet in diameter, and sometimes it consists of two, and even three stories, while the walls are always two feet thick. When it happens to consist of but one story, the walls are but a few feet high, over which there is a kind of vault; that terminates the edifice, and serves as a covering for it. It is constructed with such solidity as to be impenetrable to the heaviest rains, to defy the most impetuous winds, and is plaistered with such neatness, both outwardly and inwardly, that one might actually suppose it to be the work of man. These animals, nevertheless, use no instrument for the preparation of their mortar, but their feet, or for the application of it, but their tails. They chiefly use such materials as are not easily dissolved by water. Their wooden work consists of such trees as grow on the banks of rivers, as these are most easily cut down, stripped of their bark, and carried; and all these operations they perform before they relinquish a tree which they have once attacked. They cut it at the distance of a foot or a foot and a half from the ground. They sit as they work; and, besides the advantage of this convenient posture, they have the pleasure of continually gnawing fresh bark and soft wood, both which they prefer to most other kinds of aliment. Averse to dry wood, they always provide an ample store of these for their subsistence during the winter*. It is near their habitations that they establish their magazines; and to each hut or cabin there is one allotted, of a size proportioned to the number of its inhabitants, to

* The space allotted for the provision of eight or ten beavers, occupies from twenty-five to thirty feet square, and from eight to ten feet deep.

which they have all a common right ; nor do they offer to plunder their neighbours.

Hamlets, so to express them, have been seen, composed of twenty and even twenty-five dwellings. Such large settlements, however, are rare. In general, they do not contain more than ten or a dozen families, each of which has its own separate district, magazine, and habitation; nor will it allow any strangers to settle within its inclosure. The smallest dwellings contain two, four, and six; the largest, eighteen, twenty, and it is even said thirty beavers; and it seldom or never happens, that the number of males and females is not upon a par. Moderately speaking, therefore, their society may be said to consist frequently of one hundred and fifty or two hundred workmen, who, having first exerted their united industry and diligence in rearing a grand public work, afterwards form themselves into different bodies, in order to construct private habitations.

However numerous the republic of beavers may be, peace and good order are uniformly maintained in it. A common series of toil has strengthened their union; the conveniences which they have procured for each other, and the abundance of provisions which, after having amassed, they continue to consume together, render them happy within themselves; and, having moderate appetites, entertaining even an aversion to blood and carnage, they have not the smallest propensity to hostility or rapine, but actually enjoy all the blessings which man is only born to desire. Friends to each other, if threatened by any enemies from abroad, they know how to avoid them; and for this purpose, on the first alarm, they give notice of their mutual danger, by striking the water with their tail, which sends forth a sound that is heard in their most distant dwellings. On this occasion, each beaver, as he thinks most expedient, plunges into the water, or conceals himself within the walls of his own habitation, which is in no danger but from the fire of the angry heavens, or from the weapons of man, and which no animal dares attempt to open or to overturn.

These asylums are not only secure, but also very neat and commodious. The floor is covered with verdure, young and tender branches of trees serving them for a carpet, on which they never permit any of their excrements to be left. The window which fronts the water serves them for a balcony, from which they enjoy the fresh air, and bathe themselves the greatest part of the day. In the water they remain in an upright posture, the head and fore parts

only being visible. This element is, indeed, so necessary to them, or rather gives them so much pleasure, that they seem unable, as it were, to live without frequent immersions in it. Sometimes they go to a considerable distance under the ice; and then they are easily taken, by attacking the dwelling on one hand, and lying in wait for them, at the same time, at a hole which is purposely formed a little way off in the ice, and to which they are obliged to come for breath.

The habit which this animal has, of continually keeping the tail, and all the hind parts of the body in the water, seems to have changed the nature of its flesh. That of the fore parts, till we come to the reins, is of the same quality, taste, and consistency, as the flesh of land-animals; that of the tail, and of the hind legs and thighs, has the smell, the flavour, and all the qualities of fish. As for the tail in particular, it is even an extremity, an actual portion, of a fish fixed to the body of a quadruped. In length it generally measures a foot, in thickness an inch, and in breadth five or six inches. It is entirely covered over with scales, and has a skin altogether the same as that of a large fish.

The females are said to go four months with young. They bring forth about the close of winter, and their number generally consists of two or three at a time. Nearly at this period the males leave them, and go forth into the fields, where they enjoy all the sweets of the spring. In this season they pay occasional visits to their habitation, but never reside in it. There, however, the females remain employed in suckling, tending, and rearing their little ones, who are in a condition to follow them at the expiration of a few weeks. They then, in their turn, go abroad, where they feed on fish, or on the bark of young trees, and pass the whole of their time upon the water, or among the woods.

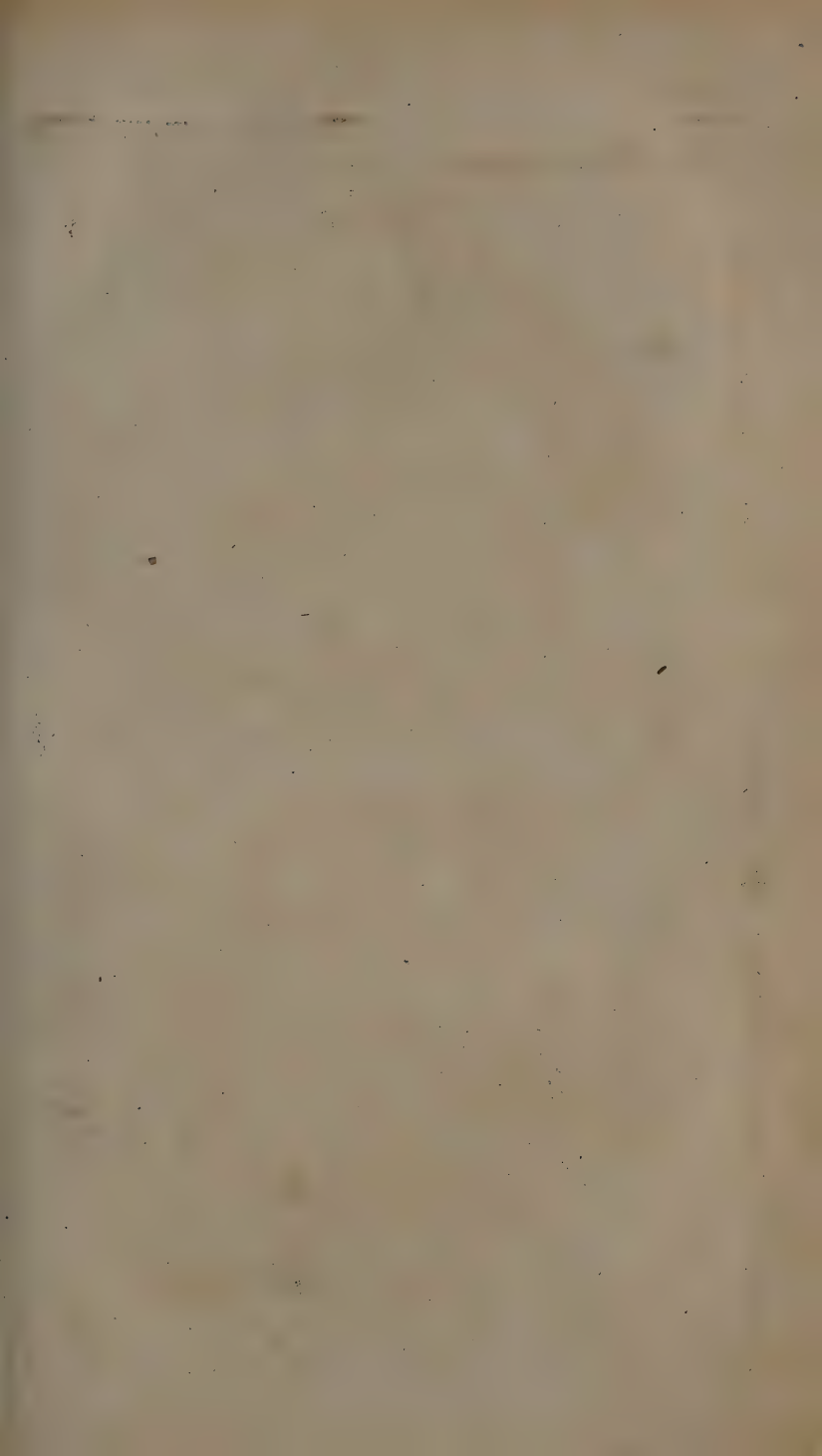
Winter is the season which is principally allotted for hunting them, as it is then only that their fur is in perfection; and when, after their fabrics are demolished, a great number happen to be taken, their society is never restored; the few that have escaped captivity or death, disperse themselves, and become houseless wanderers; or, concealed in some hole under ground, and reduced to the condition of other animals, they lead a timid life, no longer employ themselves but to satisfy their immediate, and most urgent wants, no longer retain those faculties and qualities which they so eminently possess in a state of society.

We meet with beavers in America from the thirtieth degree of north latitude to the sixtieth, and even beyond it. In the northern parts they are very common; and the farther south we proceed, their number is still found to decrease. The same observation holds with respect to the Old Continent: we never find them numerous but in the more northern countries; and in France, Spain, Italy, Greece, and Egypt, they are exceedingly rare. The ancients knew them; and by the religion of the Magi it was forbidden to kill them.

Several authors have said, that the beaver, being an aquatic animal, could not live solely on land. This opinion, however, is erroneous; for the beaver which I have in my possession having been taken when quite young in Canada, and been always reared in the house, did not know the water when he was brought to it, was afraid of it, and refused to go into it. Even when first plunged into a basin there was a necessity for keeping him in it by force. A few minutes after, nevertheless, he became so well reconciled to it, that he no longer shewed an aversion to his new situation; and, when afterwards left to his liberty, he frequently returned to it of himself, and would even roll about in the dirt, and upon the wet pavement. One day he made his escape, and descended by a cellar stair-case into the quarries under the Royal Garden. There he swam to a considerable distance on the stagnated waters which are at the bottom of those quarries; yet no sooner did he see the light of the torches which were ordered down for the purpose of finding him, than he returned, and allowed himself to be taken without making the smallest resistance.

He is an animal familiar without being fawning; and when he sees people at table, he is sure to ask for something to eat. This he does by a little plaintive cry, and by a few gestures of his fore paws. When he has obtained a morsel, he carries it away, and conceals himself, in order to eat it at his ease. When he sleeps, which he does very often, he lies upon his belly. No food comes amiss to him, meat excepted; and this he constantly refuses either raw or boiled. He gnaws every thing he comes near; and it was found necessary to line with tin the tun in which he was brought over.

Independently of the fur, which is indeed the most valuable article furnished by the beaver, this animal furnishes a substance that has been considerably used in medicine.





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The Raccoon p. 167



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The Brown Coati



The Black Coati

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Ditto



cine. This substance, which is known by the name of *castoreum*, is contained in two bladders*. The savages, it is said, obtain an oil from the tail of the beaver, which they employ as a topical remedy for different complaints. The flesh of this animal, though fat and delicate, is yet bitter, and disagreeable to the palate.

The senses of the beaver are very acute; and so delicate is its smell, that it will suffer no filth, no bad stench, to remain near it. When kept too long in confinement, and under a necessity of voiding its excrements, it drops them near the threshold of its prison, and, when the door is opened, is sure to push them out.

THE RACCOON is an animal of about the same size as a small badger; its body is short and bulky; its fur is fine, long, thick, blackish at the surface, and grey towards the bottom; its head is like that of a fox, but its ears are round and shorter; its eyes are large, of a yellowish green, and over them there is a black and transverse stripe; its snout is sharp; its tail is thick, but tapering towards a point, and marked alternately from one end to the other with black and white rings, and is at least as long as the body; its fore legs are much shorter than the hind ones, and both are armed with five strong, sharp claws.

This animal uses its paws to hold its food while eating; and its pointed claws enable it to climb trees with great facility. It runs up the trunk with the same swiftness that it moves over the plain, and frolics about to the extremity of the branches with great security and ease; on the ground, indeed, it rather bounds than runs, and its motions, though oblique, are yet always quick and expeditious.

The racoon is a native of the southern countries of America and the West-Indies, nor has it ever yet been found in any part of the Old Continent.

THE COATI.] The animal of which we are now about to treat, many authors have called *coati-mondi*. It is very different from the animal described in the preceding article. It is of a smaller size than the racoon; its body and neck,

* It is pretended, that the beavers extract the liquid which is contained in these bladders by pressing them with the foot; and that it gives them an appetite when they are averse to food. The truth, however, seems to be, that the animal uses this liquid, in order to grease its tail.

its head and nose are of a more lengthened form; its upper jaw is an inch, or an inch and an half, longer than the lower one; and its snout, which is moveable in every division, turns up at the point. The eyes of the coati are also smaller than the eyes of the racoon; its hair is longer and coarser, its legs are shorter, and its feet longer; but, like the racoon, its tail is diversified with rings; and to all its feet there are five claws.

This animal has a practice of eating its own tail, which, when not mutilated, is longer than its body, and which it generally rears aloft, and can move with ease in any direction.

From this circumstance one general inference may be drawn; namely, that in those parts which are elongated to a great degree, and of which the extremities are consequently very remote from the seat of the senses, from the center of feeling, that feeling must be weak, and the more so, the greater the distance, and the smaller the part.

As for the coati in other respects, it is an animal of prey, which subsists on flesh and blood, which, like the fox, destroys small animals and poultry, hunts for the nests of little birds, and devours their eggs; and it is probably from this conformity of disposition, that some authors have considered the coati as a species of small fox.

THE AGOUTI.] This animal is about the size of a hare, and has been considered, erroneously, as a kind of rabbit, or large rat, by the generality of nomenclators. As it has the hair of an hog, so also it has the voracious appetite of that animal. It eats indiscriminately of all things; and when satiated, it hides the remainder, like the dog or the fox, for a future occasion.

It does not, like the rabbit, dig a hole in the ground, but burrows in the holes of trees. Its ordinary food consists of the roots of the country, potatoes, yams, and such fruits as fall from the trees in autumn. It uses its fore-paws like the squirrel, to carry its food to its mouth; and as its hind-feet are longer than the fore-ones, it runs very swiftly upon plain ground, or up a hill, but upon a descent it is in danger of falling. Its sight is excellent; its hearing equals that of any other animal; and whenever it is whistled to, it stops to hearken. The flesh is dressed like that of a sucking pig, and of such as are well-fed, is tolerable

able food, though it has always a peculiar taste, and is rather tough.

It is hunted by dogs; and whenever it goes into a sugar-ground, where the canes cover the place, it is easily overtaken; for it is embarrassed every step it takes, so that a man may easily come up with it, and kill it without any other assistance than a stick. When in the open country, it usually runs with great swiftness before the dogs until it gains its retreat, within which it continues to hide, and nothing but filling the hole with smoke can force it out. For this purpose the hunter burns faggots or straw at the entrance, and conducts the smoke in such a manner that it fills the whole cavity. While this is doing, the poor little animal seems sensible of its danger, begs for quarter with a most plaintive cry, but seldom quits its hole till the utmost extremity.

The agouti seems to be a native of the south parts of America; nor is it at all known in the Old Continent. It is, however, very common in Brazil, Guiana, St. Domingo, and all the islands around. To the cold and temperate climates of America this animal is an utter stranger.

CHAP. XIV.

Of carnivorous Animals continued—The Lion—The Tiger—The Panther, Ounce, and Leopard—The Jaguar—The Cougar—The Lynx—The Caracal—The Hyæna—The Civet and Zibet—The Genett—The Ondatra and Desman.

THE LION.] IT has been remarked that in all hot climates, the terrestrial animals are larger and stronger than in cold or temperate ones. They are also bolder and more ferocious, all their natural qualities seeming to partake of the ardour of the climates in which they live. The lion, born beneath the burning sun of Africa, or of India, is above all others the fiercest and most terrible. Our wolves, our other carnivorous animals, far from being his rivals, are hardly worthy to be his providers. The lions of America (if, indeed, they deserve to be called lions) are, like the climate in which they are produced, infinitely milder than those of Africa; and, what plainly proves that the degree of fierceness in this animal depends on the degree of heat, is, that, even in the same country, those

those which inhabit the high mountains, where the air is more temperate, are different in disposition from those that dwell in the plains, where the heat is excessive.

As the lion has no enemy but man, and his species is now probably reduced to the fiftieth part of what it formerly was, it follows, that the human race, instead of having suffered a considerable diminution since the time of the Romans, is, on the contrary, more numerous, and more generally diffused. This superiority in the numbers, and the arts of the human species, while it suffices to conquer the lion, serves also to enervate, and to discourage him; for he is brave only in proportion to the success of his former encounters. Accustomed to measure his strength with every animal he meets, the habit of conquering renders him intrepid and terrible. Having never experienced the dangerous arts and combinations of man, these animals have no apprehensions from his power. They boldly face him, and seem to brave the force of his arms. They are not daunted even with the opposition of numbers; a single lion of the desert often attacks an entire caravan; and, after an obstinate combat, when he finds himself overpowered, instead of flying, he continues to combat, retreating, and still facing the enemy till he dies. On the contrary, the lions which inhabit the peopled countries of Morocco, or India, having become acquainted with man, and experienced the superiority of his arms, have lost all their courage, so as to be scared away with a shout; and seldom attack any but the unresisting flocks or herds, which even women and children are sufficient to protect.

The outward form of the lion seems to speak the superiority of his internal qualities. His figure is striking, his look confident and bold, his gait proud, and his voice terrible. His stature is not over-grown, like that of the elephant, or the rhinoceros; nor is his shape clumsy, like that of the hippopotamos, or the ox. He is in every respect compact and well-proportioned, a perfect model of strength joined with agility.

His force and muscular power, he manifests outwardly by his prodigious leaps and bounds; by the strong and quick agitation of his tail, which alone is sufficient to throw a man on the ground; by the facility with which he moves the skin of his face, and particularly that of his forehead, which adds greatly to his physiognomy, or rather to the expression of fury in his countenance; and lastly,

lastly, by the facility he has of shaking his mane, which is not only bristled up, but moved and agitated on all sides when he is enraged.

The largest lions are about eight or nine feet in length, from the snout to the insertion of the tail, which is of itself four feet long; and these large lions are about four or five feet in height. Those of the small size, are about five feet and a half in length, and three and a half in height. In all her dimensions, the lioness is about one fourth less than the lion.

The lion is furnished with a mane, which becomes longer in proportion as he advances in age. The lioness, however, is without this appendage at every age. The American animal, which the natives of Peru call *puma*, and to which the Europeans have given the denomination of *lion*, has no mane; it is also much smaller, weaker, and more cowardly, than the real lion. In truth, it is very doubtful whether these animals are at all of the same species.

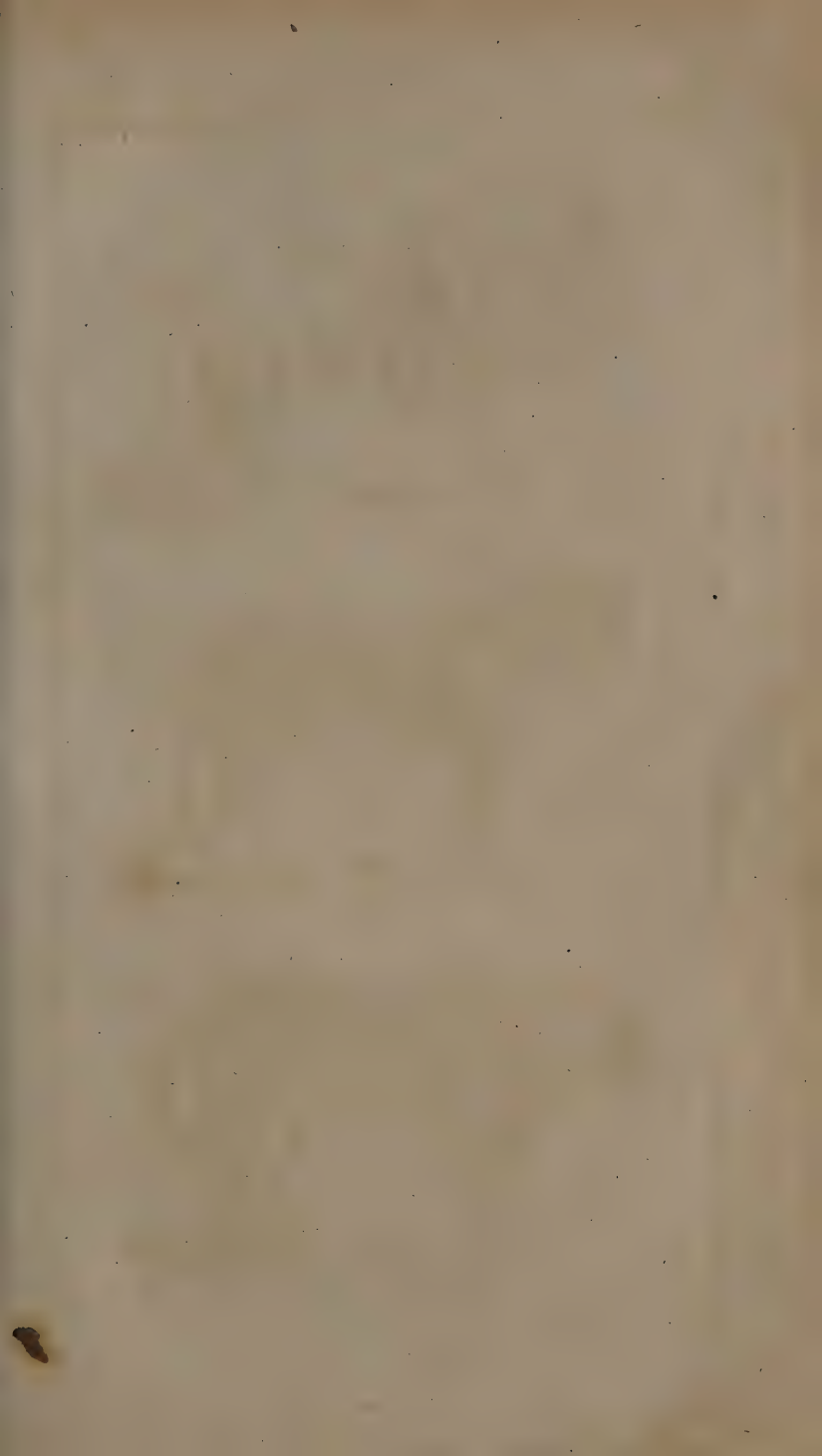
Both the ancients and the moderns allow that the lion, when newly born, is in size hardly superior to a weasel; in other words, that he is not more than six or seven inches long; and if so, some years at least must necessarily elapse before he can encrease to eight or nine feet. They likewise mention, that he is not in a condition to walk till two months after he is brought forth; but, without giving entire credit to these assertions, we may, with great appearance of truth, conclude, that the lion, from the largeness of his size, is at least three or four years in growing, and that, consequently, he must live seven times three or four years, that is, about twenty-five years.

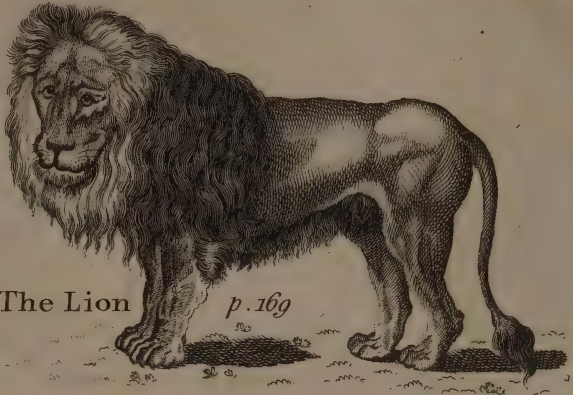
It is usually supposed that the lion is not possessed of the sense of smelling in such perfection as most other animals of prey. It is also remarked, that too strong a light incommodes him; that he seldom goes abroad in the middle of the day; that he commits all his ravages in the night; and that when he sees a fire kindled near a herd or flock he will not venture near it; that though his sight is bad, it is not, however, so faulty as his smell; and that, unlike the dog or the wolf, he rather hunts by the former than by the latter.

The lion, when hungry, boldly attacks all animals that come in his way; but, as he is very formidable, and as they all seek to avoid him, he is often obliged to hide, in order to take them by surprise. For this purpose he crouches

crouches upon his belly, in some thicket, or among the long grass, which is found in many parts of the forest. In this retreat he continues, with patient expectation, until his prey comes within a proper distance; and he then springs after it with such force, that he often seizes it at the first bound. If he misses the effort, and in two or three re-iterated springs cannot seize his prey, he continues motionless for a time, seems to be very sensible of his disappointment, and waits for a more favourable opportunity. He devours a great deal at a time, and generally fills himself for two or three days to come. His teeth are so strong that he very easily breaks the bones, and swallows them with the rest of the body. It is reported that he sustains hunger a very long time; but thirst he cannot support in an equal degree, his temperament being extremely hot. He drinks as often as he meets with water, lapping like a dog. He generally requires about fifteen pounds of raw flesh in a day; and seldom devours the bodies of animals when they begin to putrefy; but he chooses rather to hunt for fresh spoil than return to that which he had half-devoured before. While young and active, the lion subsists on what he can obtain by the chase, and seldom quits his native deserts and forests; but when he becomes old, heavy, and less qualified for exercise, he approaches the habitations of man, to whom, and to domestic animals, he then becomes a more dangerous enemy. It is observed, however, that when he sees men and animals together, it is always on the latter, never on the former, that he vents his fury; unless indeed he should be struck, and then, at no loss to know whence the blow came, he instantly deserts his prey, in order to obtain revenge for the injury. The flesh of the camel he is said to prefer to that of any other animal. He is likewise exceedingly fond of that of young elephants, which, from their inability to resist him till they have received the assistance of their tusks, he easily dispatches, when unprotected by the dam; nor are there any animals able to oppose the lion, but the elephant, the rhinoceros, the tiger, and the hippopotamos.

However terrible this animal may be, it is not uncommon, with dogs of a large size, and well supported with a proper number of men on horseback, to chase him, dislodge him, and force him to retire. But for this enterprize it is necessary that the dogs, and even the horses, should be previously disciplined; since almost all animals tremble and fly at the very smell of the lion. Though
his





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The Lioness

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The Tiger

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his skin is firm and compact, it is not, however, proof against a musket-ball, nor even a javelin; and he is seldom known to be dispatched with one blow. Like the wolf, he is frequently taken by stratagem; and for this purpose a deep hole is dug in the earth, over which, when slightly covered with earth and sticks, some living animal is fastened, as a bait. When thus entrapped, all his fury subsides; and if advantage is taken of the first moments of his surprize, or his disgrace, he may easily be chained, muzzled, and conducted to a place of security.

The flesh of the lion is of a strong and disagreeable flavour; yet the Negroes and the Indians do not dislike it, and it frequently forms a part of their food.

THE TIGER.] In the class of carnivorous animals the lion is the foremost. Immediately after him follows the tiger; which, while he possesses all the bad qualities of the former, seems to be a stranger to his good ones. To pride, to courage, to strength, the lion adds greatness, and sometimes, perhaps, clemency; while the tiger, without provocation is fierce, without necessity is cruel. Thus it is throughout all the classes of Nature, in which the superiority of rank proceeds from the superiority of strength. The first class, sole masters of all, are less tyrannical than the inferior classes, which, denied so full an exertion of authority, abuse the powers entrusted to them.

More, therefore, than even the lion, the tiger is an object of terror. He is the scourge of every country which he inhabits. Of the appearance of man, and of all his hostile weapons, he is fearless; wild animals as well as tame ones fall sacrifices before him; the young elephant and rhinoceros he sometimes attacks; and sometimes, with an encreased audacity, he braves the lion himself.

The form of the body usually corresponds with the nature, the disposition of the animal. The tiger, with a body too long, with limbs too short, with a head uncovered, and with eyes ghastly and haggard, has no characteristics but those of the basest and most insatiable cruelty. For instinct he has nothing but an uniform rage, a blind fury; so blind indeed, so undistinguishing, that he frequently devours his own progeny, and, if she offers to defend them, tears in pieces the dam herself.

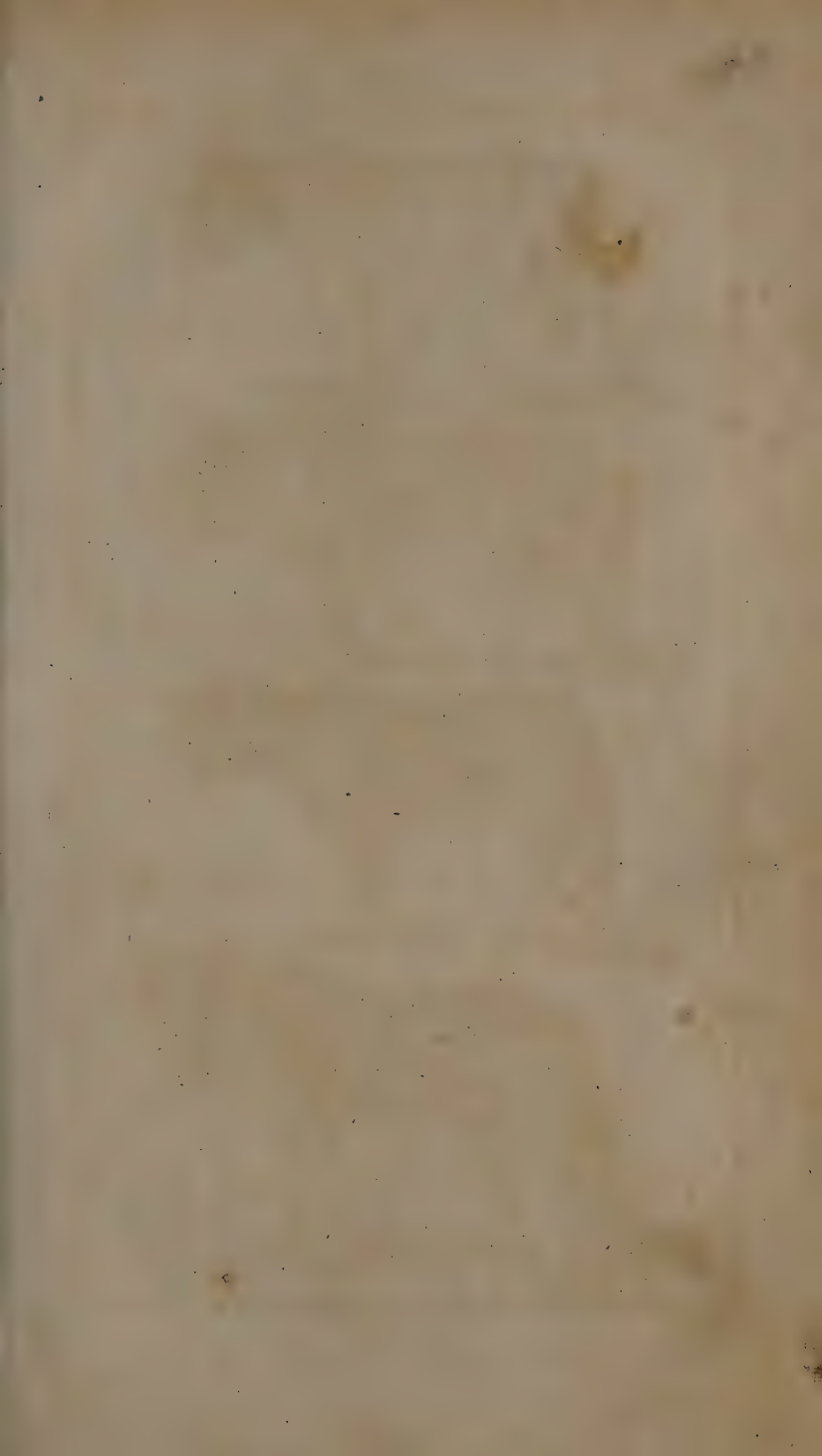
Happy is it for the rest of nature, that this animal is not common, and that the species is chiefly confined to the warmest

warmest provinces of the East. The tiger is found in Malabar, in Siam, in Bengal, and in all the countries which are inhabited by the elephant or the rhinoceros.

When he has killed a large animal, such as a horse, or a buffalo, he does not choose to devour it on the spot, fearing to be disturbed; and in order to feast at his ease, he carries off his prey to the forest, dragging it along with such ease, that the swiftness of his motion seems scarcely retarded by the enormous load he sustains.

To give a still more complete idea of the strength of this terrible creature, we shall quote a passage from Father Tachard, who was an eye-witness of a combat of one tiger against two, and even three, elephants at Siam. For this purpose, the king ordered a lofty pallisade to be built of bamboo cane, about an hundred feet square; and in the midst of this were three elephants appointed for combating the tiger. Their heads and part of their trunks were covered with a kind of armour, like a mask, which defended that part from the assaults of the fierce animal with which they were to engage. As soon, says this author, as we were arrived at the place, a tiger was brought forth from his den, of a size much larger than we had ever seen before. He was not at first let loose, but held with cords, so that one of the elephants approaching, gave him three or four blows, with his trunk, on the back, with such force, that the tiger was for some time stunned, and lay without motion, as if he had been dead. However, as soon as he was let loose, and at full liberty, although the first blows had greatly abated his fury, he made at the elephant with a loud shriek, and aimed at seizing his trunk. But the elephant, wrinkling it up with great dexterity, received the tiger on his great teeth, and tossed him up into the air. This so discouraged the furious animal, that he no more ventured to approach the elephant, but made several circuits round the pallisade, often attempting to fly at the spectators. Shortly after, a second, and then a third elephant were sent against him, and they continued to strike him so terribly with their trunks, that he once more lay for dead; and they would certainly have killed him, had not a stop been put to the combat.

The tiger, of which Father Gouie has communicated to the Academy of Sciences an anatomical description, composed by the Jesuit-Fathers at China, seems to belong to the true species, as does also that which the Portuguese have





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have distinguished by the name of *Royal Tiger*. Dellon expressly says in his travels, that there is no country of India in which tigers so much abound as Malabar, that there the species are numerous, but that the largest of all is that which the Portuguese call the *Royal Tiger*, which is very rare, and is as large as a horse.

The species of the tiger has always been much rarer, and much less generally diffused, than that of the lion. Like the lioness, nevertheless, the tigress produces four or five young ones at a birth. From her nature she is fierce at all times; but when surrounded with her infant progeny, and in the smallest danger of losing them, her rage, her fury, becomes extravagant. To oppose the daring invaders of her den, she braves every danger. On such occasions, she pursues the spoiler with an enmity the most inveterate; and he, contented to lose a part, in order to save a part, is frequently obliged to drop one of her cubs. With this she immediately returns to her den, and again pursues him: he then drops another; and, by the time she has returned with that, he generally escapes with the remainder. Should her young be torn from her entirely, with hideous cries she expresses her agony, her despair, and follows the captor to the very town, or ship, in which he may have taken refuge, and dares him, as it were, to come forth.

The skins of these animals are much esteemed all over the east, particularly in China; the Mandarines cover their seats of justice in the public places with them, and convert them into coverings for cushions in winter. The Indians eat the flesh of the tiger, and find it neither disagreeable nor unwholesome.

THE PANTHER, THE OUNCE, AND THE LEOPARD.]

The first of these species which exists in the Old Continent is the *large panther*, which we shall simply call *panther*, and which the Greeks distinguished by the name of *pardalis*, the ancient Latins, first by the name of *panthera*, afterwards by that of *pardus*, and the modern Latins by the name of *leopardus*. The body of this animal, when it has attained its full growth, is five or six feet in length from the tip of the nose to the insertion of the tail, which is above two feet long. Its skin is of a yellow hue, more or less dark on the back and sides, and whitish under the belly; it is marked with black spots annular, or in the form of beads; of these rings the generality have one or more spots in the center, of the same colour as the ex-

tremity of the ring; some of them are oval, and others circular; and they are frequently above three inches in diameter.

The second species is the *small panther* of Oppian, which our modern travellers have called *ounce*, or *onza*, corruptedly from the name *lynx*, or *lunx*. To this animal we shall preserve the name of *ounce*, which, as it has in fact some affinity to the lynx, seems to be properly applied. It is much smaller than the panther; its body, which is nearly of the size of the lynx, being but about three feet and a half in length. Its hair, as also its tail, are longer than those of the panther. The latter frequently measures above three feet; though the body of this animal is in all at least a third less than that of the panther, whose tail does not measure more than two feet, or two and a half at most. The hair of the ounce is of a whitish grey upon the back and sides, and of a grey still whiter under the belly; whereas the back and sides of the panther are always of a yellow more or less deep. In both, however, the spots are nearly of the same form, and of the same size.

The third species is unnoticed by the ancients, as it belongs to Senegal, to Guinea, and to other southern countries which they had not discovered. This animal we shall call *leopard*; a name which has been improperly applied to the large panther, but which, following the example of the generality of travellers, we shall never use unless to denote the above-mentioned animal of Senegal. It is somewhat larger than the ounce, but considerably smaller than the panther, being only four feet in length. The tail measures two feet or two feet and a half. On the back and sides the hair is of a yellow colour more or less deep; under the belly it is whitish; the spots are annular, but smaller, and less regularly disposed.

As each of these animals is different from the other, so each forms a separate species. Our furriers call the skins of the first species *panther-skins*; a name which, as it is established by use, we shall not change: those of the second species they call *African tiger-skins*, which, being an equivocal name, we have set aside, and adopted that of *ounce*: lastly, they improperly call *tiger-skins*, the skins of the animal to which we have here given the denomination of leopard.

The species of the ounce seems to be more numerous, as well as more generally diffused, than that of the panther. In Barbary, in Arabia, and in all the southern parts
of

of Asia, Egypt perhaps excepted, it is very common. Even in China, it is not unknown; and there it is distinguished by the name of *hinen-pao*.

The ounce is easily tamed, and is employed for the chase, in the hot climates of Asia, where the dog is an animal rarely to be found, not to be found at all indeed, unless introduced from other parts; and then it not only loses its voice, but its instinct. Besides, the panther, the ounce, and the leopard, are alike remarkable for bearing an insuperable antipathy to dogs; them, indeed, they seem to hunt for, and to attack, in preference to all other animals.

The JAGUAR resembles the ounce in size, and for the most part in the form of the spots with which his skin is diversified. In disposition he also resembles him. He is less terrible, less ferocious, than the panther and the leopard. The ground of his colour, like that of the latter, is a bright yellow, and not grey like that of the ounce. His tail is shorter than that of either of those animals; his hair is longer than the panther's, but shorter than that of the ounce; it is frizzled while he is young, but smooth and strait when he attains his full growth.

The jaguar lives by prey like the tiger; but a lighted brand will put him to flight, will deprive him of all courage, all vivacity; and on such occasions, especially if already satiated, one dog alone is sufficient to give him chase. He seems in all respects to partake of the indolence arising from the nature of the climate; nor does he discover any activity or alertness, unless when pressed by hunger.

Almost all the authors who have written the History of the New World, have made mention of this animal; some under the name of *tiger*, or *leopard*, others under the names which it bears at Brasil, Mexico, &c. They also speak of another animal of the same genus, and perhaps indeed of the same species, under the name of *jaguet*. We have distinguished it from the jaguar in our enumeration, as there is a probability that it is an animal of a different species. Whether they are in reality two distinct species, however, or only varieties of the same species, I cannot positively affirm, having never seen but one of the two kinds.

The jaguar is found in Brasil, in Paraguay, in Tucuman, in Guiana, in the country of the Amazons, in Mexico, and in all parts of South America. The jaguet appears to have been always more rare, or at least this

creature has always inhabited such places as are more distant from the haunts of men; and the few travellers who have mentioned it, have only drawn their accounts from those of Marcgravius and Piso.

The COUGUAR is equal in length, but inferior in thickness to the jaguar. He has a small head, a long tail, short hair, which is nearly of one entire colour, a lively red, intermixed with a few blackish tints, particularly on the upper part of the back. He is neither marked with long stripes, like the tiger, nor with round and full spots, like the leopard, nor with annular spots, like the panther and the ounce. His chin is whitish, as are also his neck, and all the inferior parts of his body. Though less strong than the jaguar, he is yet to the full as fierce, and perhaps more cruel. He appears to be yet more greedy of prey; nor, when once seized, does he ever offer to relinquish it till he has fully glutted his appetite, and his blood-thirsty fury.

This animal is not uncommon in Guiana. Formerly couguars were known to swim over in numbers to the island of Cayenne, in order to attack and devour the flocks; insomuch, that they were considered at first as a scourge to the colony. By degrees, however, the settlers lessened their number, and at length they completely drove those that remained far from their habitations.

The cougar, by the agility of his body and the length of his legs, seems calculated to run, and to climb trees better than the jaguar. They are both equally remarkable for sloth and cowardice when once glutted with prey; and seldom are they known to attack men, unless when they find them asleep. They delight in the lofty shades of forests, where they hide themselves in the covert of some thick tree, in order to dart forth on such animals as pass by. Though they live only upon prey, and quench their thirst more often with blood than with water, yet it has been said by some, that their flesh is exceedingly palatable. Piso says expressly, that it is as good as veal; and Charlevoix and others have compared it to mutton. It is hardly credible, however, from the above circumstances, that it can be well tasted; and therefore I prefer the testimony of Desmarchais, who intimates, that the best thing about this animal is his skin, with which they make housings for horses, and that its flesh is of no value, being generally lean, and of a disagreeable flavour.

THE LYNX is an animal more commonly found in cold than in temperate climates; and is at least very rare in hot ones. It was known to the Greeks and the Latins. Pliny says, that the first which were seen in Rome were brought, in the time of Pompey, from Gaul. At present they are not seen in France, a few perhaps excepted, belonging to the Alpine and Pyrenæan mountains. But the Romans, under the name of Gaul, comprehended several northern countries; and, besides, it is an acknowledged truth, that modern France is by no means so cold as was ancient Gaul formerly.

The most beautiful skins of the lynx are brought from Siberia, as belonging to the *lupus-cervarius*, and from Canada, as belonging to the *felis-cervarius*; because being, like all other animals of the New Continent, smaller than those of the Old World; in Europe they are compared to a wolf in size, and in Canada to a wild cat.

The lynx, of which the ancients have said, that the sight was so sharp as to penetrate opaque bodies, and of which the urine was made to possess the marvellous property of hardening into a solid substance a precious stone, called *lapis lynceus*, is an animal which never existed, any more than all the properties attributed to it, but in fable. To the true lynx this imaginary one has no affinity, but in name. We must not, therefore, as the generality of naturalists have hitherto done, attribute to the former, which is a real being, the properties of this imaginary one, the existence of which, Pliny himself does not seem disposed to believe, since he speaks of it only as an extraordinary beast, and classes it with the sphynx, the pegasus, and other prodigies, or monsters, the produce of Æthiopia.

Our lynx possesses not the wonderful quality of seeing through walls; but it has bright eyes, a mild aspect, and, upon the whole, an agreeable and lively appearance. Its urine produces not precious stones, but, like the cat, an animal which it nearly resembles, and of which it retains the manners, and even the cleanliness, it covers it over with earth.

The lynx has short legs, and is generally about the size of the fox. It differs from the panther and the ounce in the following particulars: it has long hair, its marks or spots are of a colour less lively, and are badly disposed: its ears are surrounded at the extremity by a stripe, or rather tuft, of black hair; its tail, which is much shorter, is black at the tip; its eyes have a whitish cast; and its countenance has

something in it more agreeable, and less ferocious. The skin of the male is more beautifully marked than that of the female. It does not walk or run like the wolf in a progressive motion, but leaps and bounds like the cat. It gains its sole subsistence by devouring other animals; and these it will follow to the very tops of trees. Neither can the wild cat, the martin, the ermine, nor the squirrel, escape its pursuit. It also seizes birds, lies in wait for the stag, the roebuck, and the hare, and with one bound often seizes them by the throat. When in possession of its prey, it first sucks the blood of the animal, and then lays open the head, in order to devour the brains. This done, it generally abandons the victim of its fury, goes in search of fresh prey, and is seldom known to return to the former; a circumstance which has given rise to the vulgar remark, that of all animals the lynx has the shortest memory. The skin of this animal changes its colour according to the season and climate. In winter it is in every respect better than it is in summer; and its flesh, like the flesh of all beasts of prey, is not proper to eat.

THE CARACAL, OR SYAGUSH.] Though the caracal resembles the lynx in size, in the formation of the body, the aspect of the head; and, though like that animal, it seems to have the peculiar, and almost singular characteristic of a stripe of black hair at the extremity of the ears, I do not scruple, nevertheless, from their disagreement in other respects, to treat of them as animals of different species.

The caracal is not spotted like the lynx; it has hair rougher and shorter, its tail is larger, and of an uniform colour; its snout is more elongated; in appearance it is less mild, and in disposition it is fiercer. The lynx is an inhabitant of the cold, or at most of the temperate regions; the caracal is only found in the hot countries; and it is as much from their difference in the articles of disposition and climate that I have judged them to be of two different species, as from the inspection and comparison of the animals themselves.

The caracal is common in Barbary, in Arabia, and in all those countries which are inhabited by the lion, the panther, and the ounce; like them it depends on prey for its subsistence; but, unlike them, from its inferior size, its inferior strength, to procure that prey it has much difficulty. Hardly, indeed, has it aught to subsist on but what the
more

more potent carnivorous animals are disposed to leave for it. It keeps at a distance from the panther, because that animal exercises its cruelty even after he is satisfied with food ; but it follows the lion, who, when the immediate cravings of his appetite are gratified, is of a disposition altogether un-hostile. From the refuse of what this noble animal has devoured, the caracal frequently enjoys a comfortable meal. Sometimes, even while the other is in search of prey, depending on its agility in climbing the trees, it accompanies him at a certain distance, and when self-preservation seems to render it necessary, perching itself aloft, it braves the fury of the lion, who cannot ascend after it like the panther. For all these reasons it is, that the caracal has been called the "lion's guide," the "lion's provider;" and that the lion, whose smell is far from being acute, is said to employ this animal to find out prey for him by its scent, of which, for its trouble, it enjoys the remains, when its master is satisfied.

The caracal is about the size of a fox, but much fiercer, and stronger. It has been known to attack, tear in pieces, and destroy in a few minutes, a large dog, who, fighting for his life, defended himself with all his strength. It is very difficult to tame this animal ; yet, if taken when very young, and afterwards reared with care, it may be trained to the chace, to which it is by nature inclined, and in which it is sure to succeed, provided it is not let loose but against such animals as are its inferiors, and unable to resist it. Should it be a service of danger, with every expression of reluctance it declines it. In India they make use of this animal to take hares, rabbits, and even large birds, all of which it surprises, and seizes with singular address and facility.

THE HYÆNA.] So striking, and even so singular are the characteristics of the hyæna, that it is hardly possible to be deceived by them. It is, perhaps, the only quadruped which has but four toes to either the fore or hind feet ; like the badger it has an aperture under the tail, which does not penetrate into the interior parts of the body ; its ears are long, strait, and bare ; its head is more square and shorter than that of the wolf ; its legs, the hind ones especially, are longer ; its eyes are placed like those of the dog ; the hair of its body, and its mane, are of a dark grey, with a small intermixture of yellow and black, disposed all along in waves ; and though in size it equals the wolf, yet

it has a contracted appearance, on which account alone it could ever have been considered as inferior in this respect to that animal.

This solitary creature resides in the caverns of mountains, in the clefts of rocks, or in dens, which it has formed for itself under the earth. Though taken ever so young, it is yet incapable of being tamed. It lives by depredation, like the wolf; but it is a stronger animal, and seemingly more daring. It sometimes attacks man, carries off cattle, follows the flocks, breaks open the sheep-cotes by night, and ravages with a voracity insatiable. By night also its eyes shine; and it is maintained that he sees better than in the day. If we may credit all the naturalists who have treated of this animal, its cry resembles the sobs or reachings of a man in a violent fit of vomiting; but, according to Kœmpfer, who was an ear-witness of the fact, it sounds like the lowing of a calf.

The hyæna defends itself against the lion, stands in no awe of the panther, and attacks the ounce, which is incapable of resisting it. When at a loss for other prey, it scrapes up the earth with its feet, and devours the carcases both of animals and men, which, in the countries that it inhabits, are interred promiscuously in the fields. We find this creature in almost all the hot climates of Africa, and of Asia; and it seems probable that the animal called *farasse*, at Madagascar, which resembles the wolf in figure, but which is larger, stronger, and more cruel, may, in fact, be the *hyæna*.

Of few animals, have so many absurd stories been told as of the animal before us. The ancients have gravely written, that the hyæna is male and female alternately. It plainly appears, however, that the circumstance which gave rise to this fable, is, the opening in the form of a cleft, which both the male and the female have, independently of the parts destined for the purposes of generation. It has, moreover been affirmed, that this creature could imitate the human voice, that it remembered the names of the shepherds, called to them, charmed them, rendered them motionless; that, at the same time, it gave chase to the shepherdesses, caused them to forget their flocks, to be distracted with love, &c. All these things might surely happen without the intervention of an hyæna; and I conclude this article, in order to avoid the reproach which is due to Pliny, of seeming to take a pleasure in compiling and publishing fables.

THE CIVET AND THE ZIBET.] The generality of naturalists have been of opinion, that there is only one species of animals that furnishes the perfume known by the name of *civet*. Two animals that furnish it I have myself had an opportunity of seeing; animals, which, though resembling each other in the essential affinities of conformation, internally as well as externally, do yet differ from each other in so many other characteristics, that there is sufficient reason to consider them as forming species in reality different.

To the first of these animals I have appropriated its original name of *civet*; and to the second, for the sake of distinction, I have given that of *zibet*.

This latter animal differs from the civet, in having a body longer and less thick, a snout more slender, flatter, and somewhat concave at the upper part; its hair is much shorter and softer; it has no mane, that is to say, hair along the neck and back-bone longer than upon the rest of the body, no black under the eyes, or upon the cheeks. All these characteristics are peculiar to, and very remarkable in, the civet. Some travellers had already suspected that there were two species of civets; but no person had distinguished them with sufficient accuracy to describe them.

These animals have been called *musk-cats*, or *civet-cats*; yet they have nothing in common with the cat. They rather resemble the fox, especially in the head. Their coat is diversified with stripes and spots; a circumstance which has occasioned them to be mistaken for small panthers, by persons who had only seen them at a distance. In every other respect, however, they differ from the panther. The perfume of the civet is very strong, and that of the zibet is so to an excess.

This humour is found in the opening which each of these animals has in the neighbourhood of the parts of generation; and though the odour is so strong, it is yet agreeable, even when it issues from the body of the animal. The perfume of the civet we must not confound with musk, which is a sanguineous humour obtained from an animal altogether different from either the civet, or the zibet. The animal that yields the musk is a kind of roe-buck without antlers, or goat without horns; nor does it possess any property in common with the civet but that of furnishing a strong perfume.

The civets, though natives of the hottest climates of Africa, and of Asia, are yet capable of living in temperate,

and even in cold countries, provided they are carefully defended from the injuries of the air, and provided with delicate and succulent food. In Holland, where no small emolument is derived from their perfume, they are frequently reared. The perfume of Amsterdam is esteemed preferable to that which is brought from the Levant, or the Indies, which is generally less genuine. That which is imported from Guinea would be the best of any, were it not that the Negroes, as well as the Indians and the people of the Levant, adulterate it with mixtures of laudanum, storax, and other balsamic and odorous drugs.

Those who breed these animals for the sake of their perfume, put them in a long and narrow sort of a box, in which they cannot turn. This box the person who is employed to collect the perfume opens behind, for this purpose, twice or thrice a week; and, dragging the animal which is confined in it backward by the tail, he keeps it in this position by a bar before. This done, he takes out the civet with a small spoon, carefully scraping with it, all the while, the interior coats of the pouch. The perfume thus obtained, is put into a vessel; and every care is taken to keep it closely shut.

The quantity which a single animal will afford, depends greatly upon its appetite, and the quality of its nourishment. It yields more, in proportion as it is more delicately and abundantly fed. Raw flesh hashed small, eggs, rice, small animals, birds, young fowls, and particularly fish, are the food in which the civet most delights.

As to the rest, the civet is a wild, fierce animal, and, though sometimes tamed, is yet never thoroughly familiar. Its teeth are strong and sharp; but its claws are feeble and blunt. It is light and active, and lives by prey, pursuing birds, and other small animals, which it is able to overcome. They are sometimes seen stealing into yards and outhouses, like the fox, in order to carry off poultry. Their eyes shine in the night; and it is very probable that they see better by night than by day. When they fail of animal food, they are found to subsist upon roots and fruits. They very seldom drink; nor do they ever inhabit humid ground; but in burning sands, and in arid mountains, they cheerfully remain.

THE GENETT is an animal smaller than the civets. It has a long body, short legs, a sharp snout, and a slender head. Its fur, which is exceedingly smooth and soft, is of



The Lynx

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The

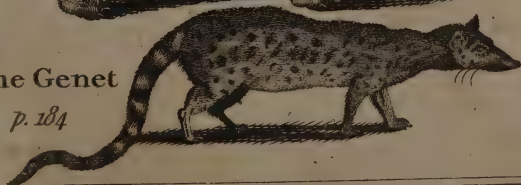
Caracal p. 180

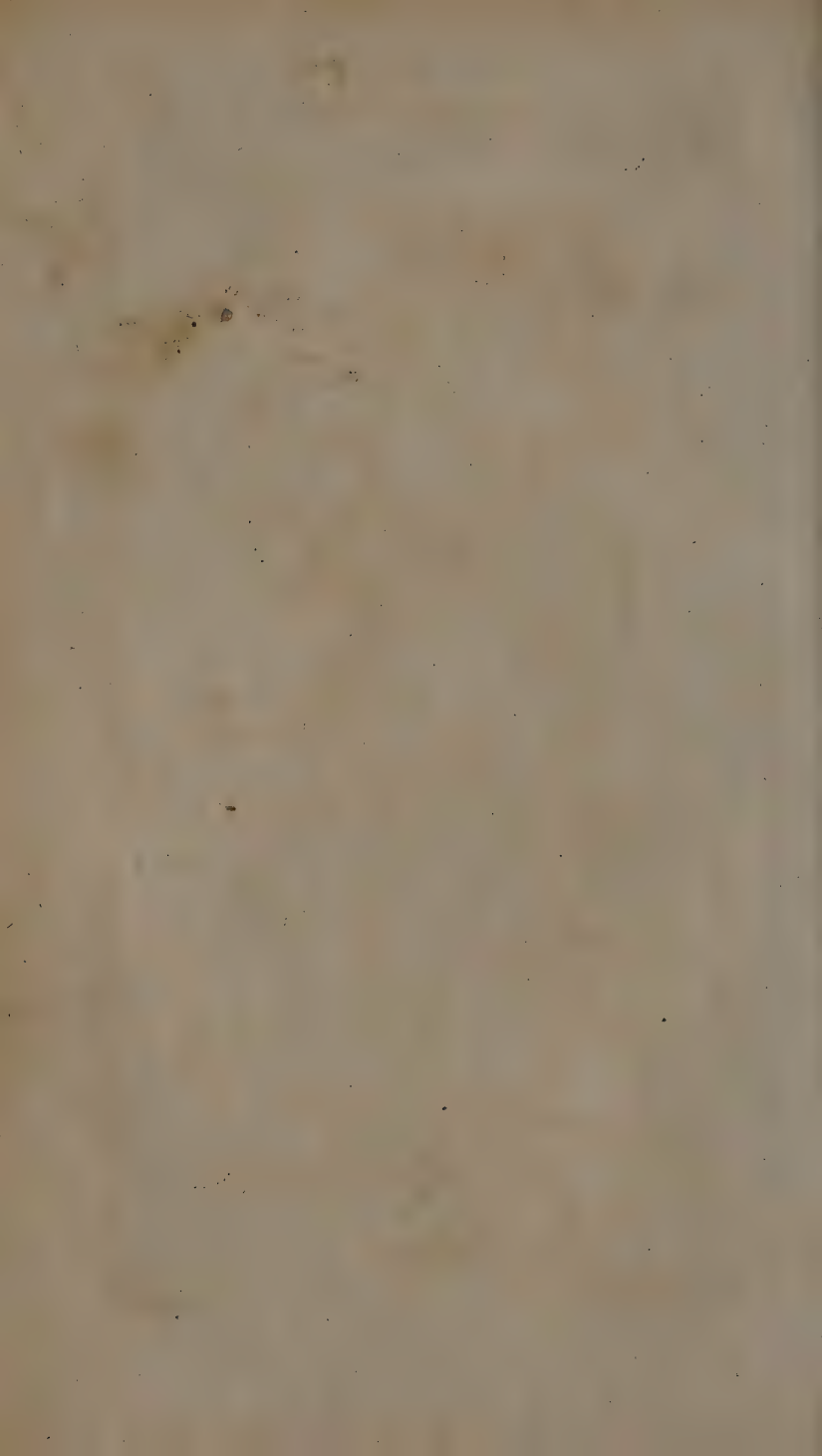


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The Genet

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an ash-colour, glossy, and marked with black stripes, which are separate upon the sides, but which unite upon the back. It has also upon the neck a kind of mane, or longish hair, which forms a black streak from the head to the tail, which last is as long as the body, and is marked with seven or eight rings, from the insertion to the tip, which are alternately black and white.

The genet has under the tail, and in the very same place with the civets, an opening, or pouch, in which is separated a kind of perfume resembling civet, but less strong, and apt sooner to evaporate. It is an animal somewhat larger than the martin, which it strongly resembles, not only in the form of the body, but also in disposition and habit, and from which it seems chiefly to differ in being more easily tamed.

The ONDATRA, and the DESMAN, are two animals which must not be confounded, though they have both been denominated *musk-rats*, and though they have a few common characteristics.

The ondatra, or musk-rat of Canada, differs from the desman in having its toes all separated from each other, in having eyes very conspicuous, and a snout very short; whereas of the desman, or musk-rat of Muscovy, the toes of the hind feet are united by a membrane. The tail of both is flat; and not only in this circumstance, but in a number of essential characteristics, they differ from the pilori, or musk-rat of the Antilles.

The ondatra is of the size of a small rabbit, and of the form of a rat. Its head is short, and similar to that of the water-rat; its hair is soft and glossy, with a very thick down underneath, nearly like that of the beaver; its tail is long, and, though of a different form, covered nevertheless with little scales, in the same manner as those of other rats. Its ears are very short, but not uncovered, like those of the domestic rat; being furnished with hair, both outwardly and inwardly.

The striking singularities which have been remarked in the ondatra, are, first, the force and great expansion of the muscles of the skin, which enables the animal, by contracting its skin, to compress its body, and reduce it to a smaller size; secondly, the suppleness of the false ribs, which permits a contraction of the body so considerable, that the musk-rat is known to obtain an easy entrance into holes too narrow for the admission of animals much smaller than

itself;

itself; thirdly, the manner in which the female voids her urine, the urethra not terminating, as in other quadrupeds, but at a hairy eminence situated over the os pubis; fourthly, the testicles, which, as in other rats, are situated on each side of the anus, become prodigiously large while the ardour for propagation lasts; and, lastly, we learn, that the vessels which contain the musk or perfume of this animal, under the form of a milky humour, and which adjoin to the parts of generation, undergo the same changes; that, during the rutting season, they enlarge and swell to a very great degree; that then the perfume is exceedingly strong, and sensibly to be distinguished at a considerable distance; but that, at the expiration of this period, they become wrinkled, they decay, and are at length totally effaced. The change in the bags which contain the perfume is effected more quickly, as well as more completely, than that of the parts of generation. They are common to both sexes, and contain a very copious milky substance, while the animals are actually in heat.

As the *ondatra* belongs to the same country as the beaver; as, like that animal, it is fond of water; and as, though smaller, it has yet nearly the same figure, the same colour, the same kind of hair, they have been often compared with each other.

In disposition and instinct also, these animals bear a considerable resemblance to each other. Like the beavers, the *ondatras* live in society during the winter. They form little dwellings, about two feet and a half, and sometimes more, in diameter; and in these there is often found an association of several families. To such habitations they do not resort in order to sleep for five or six months, like the marmots; their only object is, to obtain from them a shelter from the inclemency of the weather. They are of a round form, and are covered with a kind of dome about a foot thick. The materials of which they are composed are rushes and certain herbs interweaved together, and consolidated with some clay, which they previously prepare for that purpose with their feet.

These animals breed once a year, and generally produce five or six at a time. So strong are their fore teeth, and so excellently calculated for gnawing, that, when one of them is shut up in a box, it presently makes a hole to escape through, let the wood be ever so hard.

These animals are little inclined to ferocity, and, when taken young, are easily tamed. In the very early period of life

life they are also, which might not be expected, exceedingly handsome; for then the long, and almost uncovered tail, which renders their figure very disagreeable afterwards, is very short. They play with all the innocence and sprightliness of young cats; they never bite, and with ease might be reared, were it not for the circumstance of their obnoxious smell.

C H A P. XV.

Of the Peccary, or Mexican Hog—Of the Ternet Bat—The Spectre—The Flying Squirrel—The Grey Squirrel—The Palm Squirrel, and those of Barbary, &c.—The Ant-eaters—The short and long-tailed Manis—The Armadillo—The spotted Cavy—The Opossum—The Marmose—The Cayopolin.

THE PECCARY, OR **A**MONG the animals of the New MEXICAN HOG.] World, we meet with few species more numerous, or more remarkable, than that of the peccary, or Mexican hog. At the first glance, this animal resembles our wild boar, or rather the hog of Siam, which, as we have already observed, is, like our domestic hog, nothing more than a variety of the wild boar, or wild hog; and for this reason it has been called the boar or hog of America. The peccary, however, is of a distinct species, and refuses to engender either with the wild boar or the hog. It differs, moreover, from the hog, in a number of characteristics, both external and internal. It is less corpulent, and its legs are shorter; in the stomach and intestines there is a difference of conformation; it has no tail, and its bristles are much stronger than those of the wild boar; and, lastly, it has, upon that part of the back which borders upon the buttocks, an opening from which there is discharged an ichorous humour of a very disagreeable smell. The peccary is the only animal which has an opening in this region of the body. In the civets, the badger, and the genett, the reservoir for the perfume is situated beneath the parts of generation; and in the musk-animals we find it under the belly.

The peccary may be rendered a domestic animal, like the hog, and has, pretty nearly, the same habits and natural inclinations. It feeds upon the same aliments; and its flesh, though more dry and lean than that of the hog, is not unpalatable.

These

These animals are extremely numerous in all the parts of South America. They generally go in herds of two or three hundred together, and unite, like hogs, in the defence of each other. They are particularly fierce when their young are attempted to be taken from them. They surround the plunderer, attack him without fear, and frequently make his life pay the forfeit of his rashness.

In its native country, the peccary is rather fond of the mountainous parts, than of the low and level grounds; it seems to delight neither in the marshes, nor the mud, like our hogs; it keeps among the woods, where it subsists upon wild fruits, roots, and vegetables; it is also an unceasing enemy to the lizard, the toad, and all the serpent kinds with which the uncultivated forests of the New Continent abound. As soon as it perceives a serpent, or a viper, it at once seizes it with its fore hoofs and teeth, skins it in an instant, and devours the flesh.

The peccary, like the hog, is very prolific; the young ones follow the dam, and do not separate from her till they have come to perfection. If taken at first, they are very easily tamed, and soon lose all their natural ferocity; they, however, never display any remarkable signs of docility. They only continue to do no mischief; and they may be permitted to run tame, without apprehending any dangerous consequences. They seldom stray far from home; they return of themselves to the sty, and do not quarrel among each other, except when they happen to be fed in common. When enraged, they draw their breath with great force, and their bristles point upward; nor, on such occasions, can these be said so much to resemble the bristles of the wild boar as the sharp armour of the hedge-hog.

THE ROUSSETTE, OR TERNAT BAT*, THE ROUSSETTE†, AND THE VAMPYRE, OR SPECTRE‡.] The roussette, and the rougette, seem to form two distinct species, which, however, are so full of resemblances to each other, that they ought not, in my opinion, to be presented afunder. The latter differs from the former solely in the size of the body, and the colours of the hair. The roussette,

* Vulgarly called the *flying dog*, and, by the generality of naturalists, the *great bat of Madagascar*.

† Vulgarly called the *red-necked flying dog*.

‡ An American animal, which has hitherto been solely indicated under the vague names of *great American bat*, or *flying dog of New Spain*.

whose

whose hair is of a reddish brown, is in length nine inches, from the tip of the nose to the insertion of the tail, and in breadth three feet, when the membranes, which serve it for wings, are fully extended. The rougette, whose hair is of a reddish ash-colour, is hardly more than five inches and a half in length, and two feet in breadth; and its neck is half-encircled with a stripe of hair of a lively red, intermixed with orange-colour, of which we perceive no vestige on the neck of the roussette. They both belong nearly to the same hot climates of the Old Continent. We meet with them in Madagascar, in the island of Bourbon, in Ternato, in the Philippine, and other islands of the Indian Archipelago, where, indeed, they seem to be more common than in the neighbouring continents.

In the hotter countries of the New World, we likewise meet with another flying quadruped, of which we know not the American name, but to which I will affix the denomination of spectre, or vampyre, because it sucks the blood of men, and of animals, while they are asleep, without causing even sufficient pain to awake them. This American animal is of a species different from those of the roussette and the rougette, which are both to be found solely in Africa, and in the southern parts of Asia.

The spectre is smaller than the rougette, which is itself smaller than the roussette. The former, when it flies, seems to be of the size of a pigeon; the second of the size of a raven; and the third of the size of a large hen. Of both the roussette, and the rougette, the head is tolerably well shaped; the ears are short, and the nose is very round, and nearly in form like that of a dog. Of the spectre, on the contrary, the nose is more elongated; the aspect is as hideous as that of the ugliest bats; the head is unshapely, and surmounted with large ears, very open, and very straight; its nose is disfigured; its nostrils resemble a funnel, and have a membrane at the top, which rises up in the form of a sharp horn, or cock's comb, and greatly heightens the deformity of its face.

There is no doubt, therefore, but that the species of the spectre is different from those of the roussette and the rougette. It is an animal not less mischievous than it is deformed; it is the pest of man, the torment and the destruction of animals. In confirmation of this truth, a more authentic testimony cannot be produced than that of M. de la Condamine. "The bats," says he, "which suck
"the blood of horses, of mules, and even of men, when they
"do

“ do not guard against it by sleeping under the shelter of a pavilion, are a scourge common to most of the hot countries of America. Of these there are some of a monstrous size. At Borja, and several other places, they have entirely destroyed the large cattle which the missionaries had brought thither, and which had begun to multiply.”

The roussette and rougette are larger, stronger, and perhaps yet more mischievous than the vampyre; but, it is by open force, and in the day as well as in the night, that they commit hostilities. Fowls and small animals are the objects of their destructive fury; they even attack men, and bite their faces most cruelly; but no traveller has accused them of surprising men and animals, while asleep, and of taking such opportunities to suck their blood.

All these bats are animals carnivorous, voracious, and possessed of an appetite for every thing that offers. In a dearth of flesh or fish, they feed on vegetables and fruits of every kind. As they are fond of the juice of the palm-tree, so it is easy to take them by placing in the neighbourhood of their retreat a few vessels filled with palm-tree water, or any other fermented liquor, with which they intoxicate themselves. They fasten to, and suspend themselves from trees with their claws. They are usually seen in troops, and more so by night than by day; places which are much frequented they shun; and their favourite residence is in the deserted parts of islands.

I have frequently thought it worth while to examine how it is possible that these animals should suck the blood of a person asleep, without causing, at the same time, a pain so sensible as to awake him. Were they to cut the flesh with their teeth, or with their claws, the pain of the bite would effectually rouse any of the human species, however soundly asleep. With their tongue only, then, it is possible for them to make such minute apertures in the skin, as to imbibe the blood through them, and to open the veins without causing an acute pain.

The tongue of the vampyre I have not had an opportunity to observe; but that of several roussettes, which Mr. Daubenton has attentively examined, seems to indicate the possibility of the fact. It is sharp, and full of prickles directed backward; and it appears, that these prickles, or points, from their exceeding minuteness, may be insinuated into the pores of the skin, may enlarge them, and may penetrate them so deep, as to command a flow of the blood by the continued suction of the tongue. But we can only
reason

reason upon a fact of which all the circumstances are imperfectly known to us, and of which some are perhaps exaggerated, or erroneously related, by the writers who have transmitted them to us.

THE FLYING SQUIRREL is of a particular species, and resembles in few particulars either the squirrel or the rat. He is more common in America than in Europe, where he is seldom seen, except in Lithuania and Russia. This little animal dwells upon trees, like the squirrel; he goes from branch to branch; and when he leaps upon another tree, his skin, which hangs loose on both sides of his body, is stretched forward by his fore legs, and backward by the hind legs, and encreases the surface of his body, without adding to its weight, and consequently retards the acceleration of his fall; so that this animal reaches, in one leap, a great distance. This motion is not like the flight of a bird, neither like the fluttering of a bat; both which motions are made by striking the air with repeated vibrations. It is one single leap, caused by the first impulsion, the motion of which is only prolonged, and lasts longer, as the body of the animal, presenting to the air greater surface, finds a greater resistance, and falls more slowly.

The flying squirrel is easily tamed; but he often flies; and he must be kept in a cage, or tied with a small chain. He feeds upon bread, fruit, seeds; he is remarkably fond of the buds and shoots of the birch and pine trees. He does not seek after nuts and almonds, like the squirrel. He makes a bed of leaves, in which he buries himself, and upon which he lies in the day time, and leaves it in the night, or when pressed by hunger. As he has little agility, he becomes easily the prey of martins, and other animals, which climb up the trees; so that the species is not greatly multiplied, although they have commonly three or four young at a time.

THE GREY SQUIRREL is found in the northern parts of both continents. He is in shape like a common squirrel; the outward difference consists in his size; he is larger than squirrels generally are; the colour of his hair is not red, but light, or deep grey; and his ears are not so hairy towards the extremity, as those of our squirrels. Many authors think the species is different in Europe and America; that the grey squirrels of Europe are of the common kind, and that they change their colour according to the season, in
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the northern climates. Without denying absolutely this assertion, which does not seem sufficiently proved, we look upon the grey squirrel of Europe and America as the same animal, and as a distinct species, separated from that of common squirrels, who are found in the northern parts of both Continents, being of the same size and of the same colour; that is, of a red, more or less bright, according to the temperature of the country.

We have very little information with regard to the grey squirrel. Fernandez says, that the grey, or blackish squirrel of America dwells commonly upon trees, particularly pines; that he feeds upon fruits and seeds; that he provides his provision for the winter, and heaps it up in some hollow tree, where he retires during the winter. The grey squirrel also differs from the others in making his nest at the top of trees like birds.

THE PALM-SQUIRREL, AND THOSE OF BARBARY AND SWITZERLAND.] The palm-squirrel is as large as a rat, or a small squirrel; he lives upon the palm-trees, from which he takes his name: some call him the palmist rat, and others the palm-tree squirrel; and as he is neither of the species of a rat nor a squirrel, we shall call him palmist. His head is very near of the same form as that of the short-tailed field mouse, and covered with rough hair; his long tail does not lie on the ground, like that of the rat: he carries it erect vertically, without however laying it on his body, as the squirrel, it is covered with hair longer than that of his body, but much shorter than the hair of the squirrel's tail: his back is variegated with white and brown stripes, which distinguish the palmist from all other animals, except the squirrels of Barbary and Switzerland.

As for the squirrel of Barbary, as he is of the same continent, and of the same climate, of the same size, and very near the same form as the palmist, one should be inclined to think, that they are both of the same species, with some variety; yet there is still reason to believe them different animals. We have seen them all in the king's cabinet. The squirrel of Barbary has the head and forehead more crooked, the ears longer, the tail more bushy than the palmist; he is more like a rat than a squirrel. The squirrel of Barbary has four white stripes, and the palmist has no more than three: the white stripe is on the palmist's back-bone; on the contrary, that of the squirrel of Barbary on the same part of his body is brown and red. These animals,



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The Civet Cat p. 183



The Peccary p. 187



The Peccary p. 187



The little Grey Squirrel p. 142



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imals, indeed, have very nearly the same habits, and are of the same nature as the common squirrel. They are both of a pretty figure; their coat with white stripes is more valuable than that of the squirrel; their shape is shorter, their body lighter, and their motions quicker. The palmiss, and the squirrel of Barbary, dwell on trees like the common squirrel, but the Swiss squirrel lives upon earth, and, like the field-mouse, forms a retreat that the water cannot penetrate; he is also less docile and less gentle than the two others: he bites without mercy, (except he is lately tamed :) he is more like a rat, or a field-mouse, than a squirrel, by instinct and nature.

THE TAMANOIR, THE TAMANDUA, AND THE FOUR-MILLER, OR ANT-EATER.] South America produces three species of animals, with a long snout, a small mouth, and no teeth; their tongues, of a round form, are remarkably long; with which they penetrate into the ants nests, and draw out the ants, which is their principal food. The first of these ant-eaters is that which the Brasilians call tamandua guacu, or great tamandua, to whom the French settled in America have given the name of tamanoir. This animal is about four feet in length from the extremity of the snout to the origin of its tail; his head is fourteen or fifteen inches long, his snout stretches out to a great length; his tail, two feet and a half long, is covered with rough hair, which is more than a foot in length; his neck is short, his head narrow, his eyes black and small; his ears round, his tongue thin, more than two feet long, which he folds again in his mouth, after he draws it entirely out. His legs are but one foot high; the fore-legs are a little higher and more slender than those behind: he has round feet; the fore-feet are armed with four claws, the two middle ones are the longest; those behind have five claws. The hair of his head and body is black and white; this animal turns his tail up on his back, and covers with it his whole body, when he is inclined to sleep, or wants to shelter himself from the rain or the heat of the sun. The long hair of his tail and of his body is not round in all its extent; it is flat towards the end, and feels like dry grass. He waves his tail frequently and hastily when he is irritated, but it hangs down when he is composed, and he sweeps the way with it as he goes. The tamanoir walks slowly; a man can easily overtake him in running: his feet seem less calculated to walk than to climb, and to fasten round bodies; and he

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holds so fast a branch or a stick, that it is not possible to snatch either from him.

The second of these animals is that which the Americans called only tamandua, and to whom we shall give this name: he is much smaller than the tamanoir; he is not above eighteen inches from the extremities of the snout to the rump: his head is five inches long, his snout crooked, and underneath flat and long: he has a tail ten inches long, without hair at the end; the ears erect about an inch long, the tongue round, eight inches in length, placed in a sort of gutter or hollow canal within the lower jaw; his legs are not above four inches in height, his feet are of the same form, and have the same number of claws as the tamanoir. He climbs up, and holds fast a branch, or a stick, like the tamanoir, and his march is equally slow. He does not cover himself with his tail, which cannot shelter him, being almost bare; the hair of the fore-part is shorter than that of the tamanoir; when he sleeps he hides his head under his neck and his fore-legs.

The third of these animals is that which the naturalists of Guiana call ouatiriouaou: we gave him the name of four-millier, or ant-eater, to distinguish him from the tamanoir and tamandua. He is still much smaller than the tamandua, being not above six or seven inches in length from the extremities of the snout to the tail; his head is two inches long; the snout is not near so long as that of the tamanoir, or the tamandua; his tail is seven inches in length, is bent underneath, and bare at the end; his tongue is narrow, long, and flat; his neck is almost bare, the head is large in proportion to the body, his eyes placed low, at a little distance from the corners of the mouth, his ears are small, and hidden by the hair; his legs are but three inches in height, the fore-feet have no more than two claws, the outward is much longer than the inward one; the hind-feet have four claws, the hair of the body is about nine lines long; he feels smooth, his colour is shining, diversified with red and yellow; his feet are not made to walk, but to climb up, and to take hold of branches of trees, on which he hangs himself by the extremity of his tail.

These three animals, so different in the size and proportions of the body, have, nevertheless, many things in common, as to conformation and their natural instinct. All three feed upon ants, and suck honey and other liquid and viscous substances; they gather quickly crums of bread and small pieces of meat; they are tamed and domesticated easily; they

they can subsist a long while without food; they do not swallow all the liquor which they keep in their mouth, one part of it issues out of their nostrils; they commonly sleep in the day time, and change their station in the night; they go so slowly, that a man may overtake them easily whilst running in open ground. The savages eat their flesh, which has, however, an unfavoury taste.

The tamanoir looks at a distance like a great fox, and for that reason some travellers call him the American fox: he is strong enough to defend himself against a large dog, and even a jaguar; when he is attacked he fights standing on his hind-legs, like the bear, and makes use of his fore-claws, which are murdering weapons, for his protection; afterwards he lies on his back to use his hind-legs, and in this situation he is almost invincible, fights with obstinacy till the last extremity; and even after he has put his adversary to death, he keeps hold of him a long while. He is covered with long bushy hair, and a very thick skin; besides, his flesh is remarkably hard, and he seldom loses his life in these engagements.

The tamanoir, the tamandua, and the fourmillier, are natives of the hottest climates only of America; they are found in Brasil, in Guiana, and in the country of the Amazons, &c. they do not breed in Canada, nor in the other frozen regions of the New World, and do not belong consequently to the Ancient Continent.

THE PANGOLIN AND PHATAGIN; OR THE SHORT AND LONG-TAILED MANIS.] These animals are commonly known under the name of scaly lizards; we think ourselves authorized to reject this denomination; 1st, because it is a compound; 2dly, because it is ambiguous, and applied to both species; 3dly, because it is wrongly imagined; these animals being not only of another kind, but even of another class than the lizards, which are oviparous reptiles, while the pangolin and the phatagin are viviparous quadrupeds.

All the lizards are wholly covered, even under the belly, with a sleek speckled skin, resembling scales, but the pangolin and the phatagin have no scales under their throat, on the breast, or the belly; the phatagin, like the other quadrupeds, has hair on all these under parts of the body; the pangolin has nothing but a smooth skin without hair. The scales with which all the other parts of the body of these two animals are clothed and covered, do not stick to the skin; they are only fixed and inherent to it underneath;

they are moveable like the prickles of the porcupine. These scales are so large, so hard, and so sharp, that they frighten and discourage all animals of prey; it is an offensive armour which wounds while it resists.

The most cruel and the most voracious animals, such as the tyger and the panther, make but useless efforts to devour these armed animals; they tread upon them, roll them, but when they attempt to seize them, they are grievously wounded; they can neither terrify them by violence, nor bruise, nor smother them with their weight.

When the pangolin and the phatagin contract themselves, they do not take, as the hedge-hog, a globular and uniform figure, they form an oblong coat of armour; but their thick and long tail remains outward, and incircles their bodies; this exterior part, by which it seems these animals might otherwise be seized, carries its own defence; it is covered with scales equally hard and sharp with those with which the body is clothed, and as it is convex above, and flat below, in the form of half a pyramid, the sides are covered with square scales folded in a right angle, as thick and as sharp as the others, so that the tail seems to be still more strongly armed than the body, the under parts of which are unprovided with scales.

The pangolin, or short-tailed manis, is larger than the phatagin, or long-tailed kind; his fore-feet are covered with scales, but the phatagin's feet, and part of his fore-legs have none, being only clothed with hair. The pangolin has also larger scales, thicker, more convex, and not so close as those of the phatagin, which are armed with three sharp points; on the contrary, the scales of the pangolin are without points, and uniformly sharp. The phatagin is hairy upon the belly, and the pangolin has no hair on that part of his body, but between these scales which cover his back, some thick and long hair issues like the bristles of a hog, which are not found on the back of the phatagin.

The pangolin is from six to eight feet in length, including his tail; the tail is very near as long as the body, though it appears shorter when young; the scales are not then so large nor so thick, and of a pale colour, which is deeper when the animal is adult; they acquire such a hardness, that they resist a musket ball. Like the ant-eaters, the pangolin and the phatagin live chiefly upon ants: they have also a very long tongue, a narrow mouth, and without apparent teeth: their body and their tail are also very long, and the claws of their feet very near of the same length and the same form,

but equal in number. The ant-eaters are found in America; the pangolin and the phatagin in the East Indies, and in Africa, where the negroes call them quogelo: they eat their flesh, which they reckon a delicate, wholesome food; they also use their scales for different purposes. The pangolin, and the phatagin have nothing forbidding but their figure; they are gentle, harmless, and innocent; they feed upon insects only; they never run fast, and can only escape the pursuit of men by hiding themselves in hollow rocks, or, in holes which they dig for themselves; they are two extraordinary species, not numerous, nor very useful: their odd form seems to place them as an intermediate class betwixt the quadrupeds and the reptiles.

THE ARMADILLO.] When a quadruped is mentioned, the very name carries the idea of an animal covered with hair; and yet nature, as if willing to deviate from this characteristic uniformity, very frequently astonishes us by uncommon productions. The quadruped animals, which we look upon as the first class of living nature, and who are, next to man, the most remarkable beings of this world, are not superior in every thing, nor separated by constant attributes. The first of these characters, which constitutes their name, and which consists in having four feet, is common to lizards, frogs, &c. which, however, differ from the quadrupeds in many other respects, so as to make a separate class from them. The second general property, to produce young alive, is not peculiar to quadrupeds, since it is common with whales and other fishes of that class. And the third attribute, that of being covered with hair, exists not in several species, which cannot be excluded from the class of the quadrupeds, since, this characteristic excepted, they agree with them in all other respects.

Under the general name of armadillo, we may reckon several species which seem to us really distinct; in all of them the animal is protected by a crust resembling bone; it covers the head, the neck, the back, the flanks, the buttocks, and the tail to the very extremity. This crust is covered outwardly by a thin skin, sleek and transparent: the only parts that are not sheltered by this buckler, are the throat, the breast, and the belly, which present a white grainy skin, like that of a plucked fowl; and, in considering these parts with attention, you will perceive the appearance of scales which are of the same substance

as the crust. This crust is, however, not of one piece, as that of the turtle; it consists of several joined to each other by as many membranes, which put this armour in motion. The number of these natural bands does not depend on the age of the animal; for the young armadillo and the adults, have in the same species the same number. Father d'Abbeville has distinguished six species of the armadillo, but the principal difference between them consists in the number of bands or divisions in the armour of the different species.

The armadilloes in general are innocent, harmless animals; if they can penetrate into gardens, they will eat melons, potatoes, pulse, and roots. Though used originally to the hot climates of America, they live in temperate regions: I saw formerly one in Languedoc, which was fed at home, and went every where without doing any damage or mischief; they walk quickly, but they can neither leap, run, nor climb up trees; so that they cannot escape by flight: they have then no other resources but to hide themselves in their holes, or, if they are at too great a distance from their subterraneous habitations, they contrive to dig one before they are overcome; for the mole is not more expert in digging the ground. They are sometimes caught by the tail before they are out of sight, and they make then such a resistance, that the tail is broken without bringing out the body: in order to take them without mutilation, the burrow must be opened, they are then caught without making any resistance: when they find themselves in the hand of their pursuers, they roll themselves up into a ball; and are placed near the fire, to force them to stretch out their coat of mail; which, hard as it is, as soon as it is touched with the finger, the animal receives so quick an impression, that he contracts instantaneously. When they are in deep burrows, the method of forcing them out is to smoke them, or to let water run down the hole: some pretend, they remain under ground above three months without venturing out; it is true, that they remain in their holes in the day-time, and never go out but in the night to seek for their subsistence. The armadillo is hunted with small dogs, who soon overtake him; but he stops before they have reached him, and contracts himself: in this condition he is taken and carried off. If he finds himself on the brink of a precipice, he escapes the dogs and the hunters, by rolling himself up, and letting himself fall down like a ball without injury or prejudice to his scales.

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These animals are fat, and very prolific; the female brings forth, as it is reported, four young ones every month, which makes their species very numerous. They are good to eat, and are easily taken with snares laid for them on the banks of rivers, and in the marshy grounds, which they inhabit in preference. It is pretended, that they are not afraid of the bite of the rattle-snake; it is likewise pretended, that they live in peace with these reptiles, which are often found in their holes. The savages apply their scales to different purposes, and make of them baskets, boxes, and other small vessels light and solid.

THE PACA, or SPOTTED CAVY, is an animal of the New World, who digs a burrow like a rabbit, to which he has been compared, though there is scarcely any likeness between these two animals: he is much larger than the rabbit, and even than the hare; he has a round head, and the snout short; he is fat and bulky, and, by the form of his body, he is more like a pig, in grunting, waddling, and the manner of eating; for he does not use, as the rabbit does, his fore feet to carry food to his mouth; and grubs up the earth like the hog, to find his subsistence. These animals inhabit the banks of rivers, and are found in damp and hot places of South America: their flesh is very good to eat, and excessively fat: their skin is eaten as that of a pig, for which reason a perpetual war is carried on against these animals. Hunters find it very difficult to take them alive; and when they are surprised in their burrows, which have two openings, they defend themselves, and bite with great rage and inveteracy. Their skin, though covered with short and rough hair, is valuable because it is spotted on the sides. These animals bring forth young in abundance: men and animals of prey destroy a great quantity of them, and yet the species is still numerous. They are peculiar to South America, and are found nowhere in the Old Continent.

THE OPOSSUM is an animal of America, which is easily distinguished from all others by two singular characters: the first is, that the female has under the belly a large cavity, where she receives, and suckles her young; the second is, that the male and the female have no claws on the great toe of the hind-feet, which are separated from the others, as the thumb in the hand of a man, whilst the

other toes are armed with crooked claws, as in the feet of other quadrupeds.

The opossum is only found in the south parts of the New World; but he does not constantly dwell in the hottest climates. He is found not only in Brasil, Guiana, and Mexico, but also in Florida, Virginia, and other temperate regions of this continent. It produces often, and a great number of young each time. Most authors say, four or five young; others, six or seven. Marcgrave affirms, that he has seen six young living in the bag of the female; they were about two inches in length, they were already very nimble, they went in and out of the bag many times in a day; they are still smaller when they are just brought forth. Some travellers say, that they are not larger than flies when they go out of the womb into the bag, and stick to the paps: this fact is not so much exaggerated as some people may imagine, for we have seen ourselves in an animal, whose species is like that of the opossum, young ones sticking to the paps not larger than a bean; and we may presume, without improbability, that in these animals the womb is only the place of conception, of the formation, and first unfolding of the foetus, which increases in the bag.

The young opossums stick to the paps of the mother till they have acquired strength enough, and a sufficient growth to move easily. This fact is not doubtful, nor even particular to this species only. Some authors pretend, that they stick to the paps for several weeks; others say, that they remain in the bag only the first month after they go out of the womb. One may open with facility this bag, observe, count, and even feel the young without disturbing them; they will not leave the pap, which they hold with their mouth, but when they are strong enough to walk; then they let themselves fall into the bag, and go out, and seek for their subsistence; they go in again to sleep, to suckle, and to hide themselves when they are terrified; when the mother flies, and carries in it the young, her belly does not seem bigger when she breeds than common, for in the time of the true gestation, it is scarcely perceivable that she is with young.

From the mere inspection of the form of the feet of this animal, it is easy to judge, that he walks awkwardly, and seldom runs; a man can overtake him without hastening his steps. He climbs up trees with great facility, hides himself



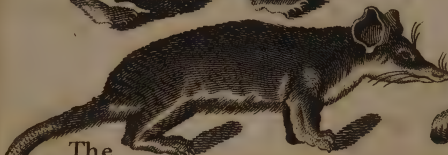
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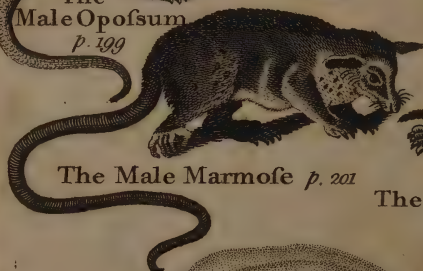
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The
Paca
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The
Male Opossum
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The Male Marmose p. 201

The Female Opossum
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The Hedge Hog without Bristles
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The
Female Marmose
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Ditto with Bristles



himself in the leaves to catch birds, or hangs himself by the tail, the extremity of which is muscular, and flexible as the hand, so that he may squeeze, and even incurvate all the bodies he seizes upon: he sometimes remains a long while in this situation, without motion; his body hangs with the head downward, when he silently waits for his prey; at other times, he balances himself to jump from one tree to another like the monkeys with like muscular and flexible tails, which he resembles also in the conformation of the feet. Though he is voracious, and even greedy of blood, which he sucks with avidity, he feeds also upon reptiles, insects, sugar-canes, potatoes, roots, and even leaves and bark of trees. He may be fed as a domestic animal; he is neither wild nor ferocious; he is easily tamed, but he creates disgust by his bad smell, stronger and more offensive than that of the fox; his figure is also forbidding; for independently of his ears, which resemble those of an owl, of his tail, which resembles that of a serpent, and of his mouth, which is cleft to the very eyes, his body appears always very dirty, because his hair is neither smooth nor curled, but tarnished, as if covered with dirt. The bad smell of this animal resides in the skin, for his flesh is eatable. The savages hunt this animal, and feed on his flesh heartily.

THE MARMOSE, or MURINE OPOSSUM resembles in most respects the latter species; they are natives of the same climate, in the same continent, and are very much alike by the form of the body, the conformation of the feet, and the tail, a part of which is covered with scales, the upper part only being hairy. But the marmose is smaller than the common opossum, his snout is still sharper; the female has no bag under the belly, she has only two loose skins near the thighs, between which the young place themselves to stick to the paps. When the young are brought forth, they are not so large as small beans, they then stick to the paps. The brood of the marmose is very numerous; we have seen ten small marmoses, each sticking to a pap, and the mother had still four more paps. I am persuaded, that these animals bring forth a few days after the conception. The young are then foetus only, which are not come to the fourth part of their growth. The mother always miscarries, and the foetuses save their lives in sticking to the paps, without leaving them till they have

have acquired the growth and strength which they would naturally get in the womb.

THE CAYOPOLLIN, or MEXICAN OPOSSUM (says Fernandes) is a small animal, little larger than a rat, very much resembling the opossum in the snout, the ears, and the tail, which is thicker and stronger than that of a rat; he makes use of it, as we do of our hands; he has thin transparent ears; the belly, the legs, and feet, white. The young, when they are frightened, embrace the mother, who lifts them up on the trees. This species has been found on the mountains of New Spain.

C H A P. XVI.

Of the Elephant—The Rhinoceros—The Camel and Dromedary—The Buffalo, the Urus, the Bison, and the Zebu.

THE ELEPHANT.] THE human race excepted, the elephant is the most respectable of animals. In size he surpasses all other terrestrial creatures, and in understanding he is inferior only to man. Of all the brute creation, the elephant, the dog, the ape, and the beaver are most admirable for their sagacity; but the genius of the dog is only borrowed, being instructed by man in almost every thing he knows; the monkey has only the appearance of wisdom, and the beaver is only sensible with regard to himself, and those of his species. The elephant is superior to them all three; he unites all their most eminent qualities. The hand is the principal organ of the monkey's dexterity; the elephant with his trunk, which serves him instead of arms and hands, with which he can lift up, and seize the smallest, as well as the largest objects, carry them to his mouth, place them on his back, hold them, or throw them far off, has the same dexterity as the monkey, and at the same time, the tractableness of the dog; he is like him susceptible of gratitude, capable of a strong attachment; he uses himself to man without reluctance, and submits to him, not so much by force, as good treatment; he serves him with zeal, intelligence, and fidelity; in fine, the elephant, like the beaver, loves the society of his equals, and makes them understand him.

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They are often seen to assemble together, disperse, act in concert, and if they do not erect buildings, and do not work in common, it is, perhaps, for want of room only, and tranquillity; for men have very anciently multiplied in all the regions inhabited by the elephant; he consequently lives in fear and anxiety, and is no where a peaceful possessor of a space large and secure enough to establish his habitation on a settled spot. Every being in nature has his real price, and relative value; to judge of both in the elephant, we must allow him at least the judgment of the beaver, the dexterity of the monkey, the sentiment of the dog, and add to these qualifications besides, the peculiar advantages of strength, size, and longevity. We must not forget his arms, or his defence, with which he can pierce through, and conquer the lion. We must observe, that he shakes the ground at every step; that with his trunk he roots up trees; that with the strength of his body he makes a breach in a wall: that being terrible by his force, he is invincible by the resistance only of his enormous mass, and by the thickness of the leather which covers it; that he can carry on his back a tower armed in war, with a number of men; that he alone moves machines, and carries burthens, which six horses cannot move. To this prodigious strength he joins courage, prudence, coolness, and an exact obedience; he preserves moderation even in his most violent passions; he is more constant than impetuous in love; in anger he does not forget his friends; he never attacks any but those who have given him offence; he remembers favours as long as injuries: having no taste for flesh, and feeding chiefly upon vegetables, he is not naturally an enemy to other animals; he is beloved by them all, since all of them respect him, and have no cause to fear him. For these reasons, men have had at all times a veneration for this great, this first of animals. The ancients considered the elephant as a prodigy, a miracle of nature; they have much exaggerated his natural faculties; they attributed to him, without hesitation, not only intellectual qualities, but moral virtues.

In a wild state, the elephant is neither bloody nor ferocious; his manners are social, and he seldom wanders alone; he commonly walks in company, the oldest leads the herd, the next in age drives them, and forms the rear; the young and the weak are in the middle. The females carry their young, and hold them close with their trunks. They only observe this order, however, in perilous marches, when
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they go to feed on cultivated lands; they walk or travel with less precaution in forests and solitary places, but still keeping at such a moderate distance from each other, as to be able to give mutual assistance, and seasonable warnings of danger. Some, however, straggle, and remain behind the others; none but these are attacked by hunters, for a small army would be requisite to assail the whole herd, and they could not conquer without a great loss of men; it is even dangerous to do them the least injury, they go strait to the offender, and notwithstanding the weight of their body, they walk so fast that they easily overtake the lightest man in running; they pierce him through with their tusks, or seize him with their trunks, throw him against a stone, and tread him under their feet; but it is only when they have been provoked, that they become so furious and so implacable. It is said, that when they have been once attacked by men, or have fallen into a snare, they never forget it, and seek for revenge on all occasions. As they have a most exquisite sense of smelling, perhaps more perfect than any other animal, owing to the large extent of their nose, they smell a man at a great distance, and could easily follow him by the track. These animals are fond of the banks of rivers, deep valleys, shady places, and marshy grounds; they cannot subsist a long while without water, and make it thick and muddy before they drink; they often fill their trunks with it, either to convey it to their mouth, or only to cool their nose, and to amuse themselves in sprinkling it around them; they cannot support cold, and suffer equally from excessive heat, for to avoid the burning rays of the sun, they penetrate into the thickest forests; they also bathe often in the water; the enormous size of their body is rather an advantage to them in swimming, and they do not swim so deep in the water as other animals; besides, the length of their trunk, which they erect, and through which they breathe, takes from them all fear of being drowned.

Their common food is roots, herbs, leaves, and young branches; they also eat fruit and corn, but they have a dislike to flesh and fish. When one of them finds abundant pasture, he calls the others, and invites them to come and feed with him. As they want a great quantity of fodder, they often change their place, and when they find cultivated lands, they make a prodigious waste; their bodies being of an enormous weight, they destroy ten times more with their feet, than they consume for their food, which

may

may be reckoned at the rate of one hundred and fifty pounds of grass daily. As they never feed but in great numbers, they waste a large territory in about an hour's time; for this reason, the Indians and the Negroes take great pains to prevent their visits, and to drive them away, by making a great noise, and great fires; notwithstanding these precautions, however, the elephants often take possession of them, drive away the cattle and men, and sometimes pull down their cottages. It is difficult to frighten them, as they are little susceptible of fear; nothing can stop them but fire-works, and crackers thrown amongst them, the sudden effect of which, often repeated, forces them sometimes to turn back. It is very difficult to part them, for they commonly attack their enemies all together, proceed unconcerned, or turn back.

The female elephant goes two years with young; when she is in that condition, the male never copulates with her. They only bring forth a young one, which has teeth as soon as brought forth, he is then larger than a boar; yet his tusks are not visible, they appear soon after, and at six months old, are some inches in length; at that age, the elephant is larger than an ox, and the tusks continue to increase till he is advanced in years.

It is very easy to tame the elephant. As he is the strongest and most rational of animals, he is more serviceable than any of them; but he seems to feel his servile condition, for he never couples or generates in a domestic state.

There is no domestic elephant but has been wild before, and the manner of taking, taming, and bringing them into submission, deserves a particular attention. In the middle of forests, and in the vicinity of the places which they frequent, they choose a large space which they encircle with pallisadoes; the strongest trees of the forest serve instead of stakes, to which they fasten cross pieces of timber, which support the other stakes; a man may easily pass through this pallisado; there is another great opening, through which the elephant may go in, with a trap hanging over it, or a gate which is shut behind him: to bring him to that inclosure, he must be enticed by a tame female, ready to take the male; and when her leader thinks she is near enough to be heard, he obliges her to indicate by her cries, the condition she is in; the wild male answers immediately, and begins his march to join her; she repeats her call now and then, and arrives first to the first inclosure, where the male following her track, enters through the same gate.

gate. As soon as he perceives himself shut up, his ardour vanishes, and when he discovers the hunters, he becomes furious; they throw at him ropes with a running knot to stop him; they fetter his legs and his trunk, they bring two or three tame elephants, led by dexterous men, and try to tie them with the wild elephant, and at last, by dint of dexterity, strength, terror, and caresses, they succeed in taming him in a few days.

The elephant once tamed, becomes the most tractable and the most submissive of all animals; he conceives an affection for his leader, he caresses him, and seems to guess whatever can please him: in a little time he understands the signs, and even the expression of sounds; he distinguishes the tone of command, that of anger or good-nature, and acts accordingly: he never mistakes the words of his master; he receives his orders with attention, executes them with prudence and eagerness, without precipitation; for his motions are always measured, and his character seems to participate of the gravity of his body; he is easily taught to bend the knee to assist those who will ride on his back; he caresses his friends with his trunk, and salutes with it the persons he is directed to take notice of: he makes use of it to lift burdens, and helps to load himself; he has no aversion to being clothed, and seems to delight in a golden harness or magnificent trappings; he is easily put to the traces of carts, and draws ships upon occasion: he draws evenly, without stopping, or any marks of dislike, provided he is not insulted by unseasonable correction, and that his driver seems to be thankful for the spontaneous exertion of his strength. His leader is mounted on his neck, and makes use of an iron rod crooked at the end, with which he strikes him gently on the head to make him turn or increase his pace; but often a word is sufficient, especially, if he has had time to make himself well acquainted with his leader, and has a confidence in him; his attachment is sometimes so strong, and so lasting, and his affection so great, that commonly he refuses to serve under any other person, and he is known to have died of grief for having in anger killed his governor.

The species of the elephant is numerous, though they bring forth but one young once in two or three years; the shorter the life of animals is, the more they multiply: in the elephant, the length of his life compensates the small number; and if it is true, as has been affirmed, that he lives two hundred years, and that he begets when he is
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one hundred and twenty years old, each couple brings forth forty young in that space of time : besides, having nothing to fear from other animals, and little even from men, who take them with great difficulty, the species has not decreased, and is generally dispersed in all the southern parts of Africa and Asia.

From time immemorial the Indians made use of elephants in war. Amongst those nations unacquainted with the European military discipline, they were the best troop of their armies ; and as long as battles were decided by mere weapons, they commonly vanquished : yet, we see in history, that the Greeks and Romans used themselves soon to those monsters of war ; they opened their ranks to let them go through ; they did not attempt to wound them, but threw all their darts against their leaders, who were forced to surrender, and to calm the elephants when separated from their troops ; and now that fire is become the element of war, and the principal instrument of death, the elephants, who are afraid of the noise and the fire of the artillery, would be rather an incumbrance in battle, and more dangerous than useful.

In those happy regions, however, where our cannons and murdering arts are yet scarcely known, they fight still with elephants. At Cochin, and in the other parts of Malabar, they do not make use of horses, and all those who do not fight on foot are mounted upon elephants. In Tonquin, Siam, and Pegu, the king, and all the grandees, never ride but upon elephants : on festival days they are preceded and followed by a great number of these animals richly caparisoned, and covered with the richest stuffs. On comparing the relations of travellers and historians, it appears that the elephants are more numerous in Africa than in Asia ; they are there also less mistrustful, not so wild, and, as if they knew the unskilfulness and the little power of the men with whom they have to deal in this part of the world, come every day without fear to their habitations.

In general, however, the elephants of Asia are of a larger size, and superior in strength to those of Africa ; in particular, those of Ceylon, who exceed in courage and sagacity all those of Asia : probably they owe these qualifications to their education, more improved in Ceylon than any where else. The elephants of the Indies carry easily burdens of three or four thousand weight ; the smallest, that is, those of Africa, lift up freely with their trunks burdens of two hundred pounds weight, and place them on their shoulders ; they

take in this trunk a great quantity of water, which they throw out around them, at seven or eight feet distance; they can carry burdens of more than a thousand weight upon their tusks; with their trunk they break branches of trees, and with their tusks they root out the trees. One may judge of their strength by their agility, considering at the same time the bulk of their body; they walk as fast as a small horse on the trot, and when they run, they can keep up with a horse on full gallop, which seldom happens in their wild state, except when they are provoked by anger, or frightened. The tame elephants travel easily, and without fatigue, fifteen or twenty leagues a day; and when they are hurried, they may travel thirty-five or forty leagues. They are heard at a great distance, and may be followed very near on the track, for the traces which they leave on the ground are not equivocal; and on the ground where the steps of their feet are marked, they are fifteen or eighteen inches in diameter.

When the elephant is taken care of, he lives a long while even in captivity. Some authors have written, that he lives four or five hundred years; others, two or three hundred; and the most credible, one hundred and twenty, thirty, and even one hundred and fifty years. I take this last opinion to be the nearest to truth; whatever care, however, is taken of the elephant, he does not live long in temperate countries, and still less in cold climates. The elephant which the king of Portugal sent to Louis XIV. in 1668, and which was then but four years old, died in his seventeenth, in January 1681, and lived only thirteen years in the menagerie of Versailles, where he was treated with care and tenderness, and fed with profusion: he had every day four pounds of bread, twelve pints of wine, two buckets of porridge, with four or five pounds of bread, two buckets of rice boiled in water, without reckoning what was given to him by visitors; he had, besides, every day one sheaf of corn to amuse himself; for, after he had eaten the corn ears, he made a kind of whip of straw, and used it to drive away the flies; he delighted in breaking the straw in small bits, which he did with great dexterity with his trunk; and, as he was led to walk daily, he plucked the grass and eat it.

The common colour of the elephant is ash-grey, or blackish. The white are extremely scarce; some have been seen at different times in the Indies, where also some are found of a reddish colour.

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The elephant has very small eyes, comparatively with his enormous size, but they are sensible and lively; and what distinguishes them from all other animals, is, their pathetic sentimental expression. He seems to reflect, to think, and to deliberate; and never acts till he has examined and observed several times, without passion or precipitation, the signs which he is to obey. Dogs, the eyes of which have much expression, are animals too lively to distinguish their successive sensations; but as the elephant is naturally grave and sedate, one may read in his eyes the order and outward appearance of his interior affections.

He has a quick hearing, and this organ is outwardly like that of smelling, more marked in the elephant than in any other animal; his ears are very large, even in proportion to his body; they are flat, and close to the head, like those of a man; they commonly hang down, but he raises them up, and moves them with great facility; he makes use of them to wipe his eyes, and to cover them against the inconvenience of dust and flies. He delights in the sound of instruments, and seems to like music; he soon learns to beat time, and to move accordingly: he seems animated by the beat of the drum, and the sound of trumpets; he has an exquisite smell, and is passionately fond of perfumes of all sorts, and of fragrant flowers; he selects them one after another, and makes nosegays, which he smells with eagerness, and then carries them to his mouth as if he intended to taste them.

His sense of feeling centers in his trunk; but it is as delicate and as distinct in that sort of hand as in that of man: this trunk, composed of membranes, nerves, and muscles, is, at the same time, a member capable of motion, and an organ of sense: the animal can not only move and bend it, but he can shorten, lengthen, and turn it all ways. The extremity of this trunk terminates by an edge, which projects above like a finger; it is with this sort of finger that the elephant does whatever we do with ours; he picks up from the ground the smallest pieces of money; he gathers nuts and flowers, choosing them one after another; he unties knots, opens and shuts doors, turning the keys, and bolts them; he learns to draw regular characters with an instrument as small as a pen.

Although the elephant has a more retentive memory, and more intelligence than any other animal, he has the brain smaller than most of them: he is, at the same time, a miracle of intelligence, and a monster of matter; his body

is very thick, without any suppleness; the neck is short, and very stiff; the head, small and deformed; the ears of an excessive diameter; and the nose is of a still more disproportionate length; the eyes are too small, as well as the mouth; his legs are like massive pillars, strait and stiff; the feet so short and so small, that he seems to have none; the skin is hard, thick, and callous. All these deformities are remarkable, as all of them are exhibited in large; and they are more disagreeable to the eye, as most of these deformities have no other example in the creation; no other animal having either the head, the feet, the nose, the ears, or the tusks, made or placed like those of the elephant.

The elephant is yet singular in the conformation of the feet, and the texture of the skin. He is not clothed with hair like other quadrupeds; his skin is bare; some bristles issue out of the chops; they are very thin on the body, and thicker on the eye-lids, on the back part of the head, within the ears, the thighs and the legs. The epidermis, or outside skin, hard and callous, has two sorts of wrinkles, some hollow, others prominent. In man, and other animals, the epidermis sticks every where close to the skin. In the elephant, it is only fastened by some points, like two quilted stuffs one above the other. This epidermis is naturally dry, and soon acquires three or four lines of thickness, by the crusts which are generated one above the other drying up. It is this thickness of the epidermis which produces the *elephantiasis*, or dry leprosy, to which man, whose skin is bare, like that of the elephant, is sometimes subject. This distemper is very common to elephants; and, to prevent it, the Indians take care to rub them often with oil, and to preserve the skin supple by frequent bathing. It is rather tender where it is not callous; and the elephant is so fearful of the sting of the flies, that he not only employs his natural motions, but even the resources of his intelligence, to get rid of them; he makes use of his tail, of his ears, of his trunk, to strike them; he contracts his skin wherever he can, and squeezes them to death betwixt his wrinkles. He cleans his skin by rubbing it with pumice stones, and afterwards pours on it perfumed oil and colours. The conformation of the feet and legs is also singular, and different in the elephant from that of other animals; the fore legs seem to be higher than those behind, yet the hind legs are the longest; they are not bent like the hind legs of a horse, or an ox, the thighs of which seem to be of the same piece with the buttocks, their knee is very near the belly, and the

the foot so high, and so long, that it seems to make a great part of the leg. In the elephant, on the contrary, this part is very short, and touches the ground; he has the knee, like man, in the middle of the leg, not near the belly. This foot, so short and so small, is divided into five toes, which are all covered with a skin, none appearing outwardly; one sees only a sort of claws, the number of which varies, though that of the toes is constant; for he has always five to each foot, and commonly also five claws; but sometimes he has no more than four, or even three; and, in this case, they do not correspond exactly with the extremity of the fingers.

The ears of the elephant are very long; his tail is not longer than the ear; it is commonly near three feet in length; it is rather thin, sharp, and garnished at the extremity with a tuft of large, black, shining, and solid bristles, which are as large and as strong as wire; and a man cannot break them with his hands, though they are elastic and pliant. This tuft of hair is an ornament which the Negro women are particularly fond of; and they attribute to it some particular virtue, according to their superstitious notions; an elephant's tail is sometimes sold for two or three slaves; and the Negroes often hazard their lives to cut and snatch it from the living animal.

The largest elephants of the Indies, and the eastern coasts of Africa, are fourteen feet high; the smallest, which are found in Senegal, and in the other western parts of Africa, are not above ten or eleven feet; and those which have been brought young into Europe, were not so high. That at the menagerie of Versailles, which came from Congo, was but seven feet and a half high in his seventeenth year. During thirteen years that he lived in France, he did not grow above a foot; so that, at the age of four, when he was sent, he was only six feet and a half high. These enormous masses of matter, as we have observed, move with much celerity; they are supported by four members, which are more like pillars, or massive columns, from fifteen to eighteen inches in diameter, and five or six feet in height; their legs are therefore once or twice longer than those of a man. Thus, the elephant, with one step to a man's two, will overtake him in running.

In order to give a complete idea of the nature and intelligence of this singular animal, we shall insert here some particulars communicated to us by the Marquis of Montmirail. The Indians make use of the elephant to carry artillery over mountains; and it is then, that he gives the

greatest proofs of his intelligence. He acts in the following manner:—When the oxen, yoked two and two, endeavour to draw up the mountain the piece of artillery, the elephant pushes the breech of the gun with his forehead; and every effort that he makes, he supports the carriage with his knee, which he places near the wheel; and it seems as if he understands what is said to him. When his leader employs him in some hard labour, he explains what is his work, and the reasons which ought to engage him to obey. If the elephant shews an aversion to comply, the *cornca* (so his leader is called) promises to give him arrack, or something he likes; then the animal agrees to every thing proposed; but it is dangerous to forfeit his word; more than one *cornca* has been the victim of his deception. An instance of this happened in the Deckan, which deserves to be recorded; and, however incredible it may appear, it is exactly true. An elephant had been revenged of his *cornca* in killing him. His wife, witness of this catastrophe, took her two children, and threw them to the feet of the animal, still furious; telling him, *Since thou hast killed my husband, take also my life, and that of my children.* The elephant stopped short, grew calm, and, as if he had been moved with regret and compassion, took with his trunk the largest of the two children, placed it on his neck, adopted him for his *cornca*, and would have no other leader.

If the elephant is vindictive, he is no less grateful. A soldier of Pondicherry, who commonly carried to one of these animals a certain measure of arrack every time that he received his pay, having one day drank more than common, and seeing himself pursued by the guard, who threatened to conduct him to prison, took refuge under the elephant, and slept there. It was in vain, that the guard attempted to draw him out from this asylum; the elephant defended him with his trunk. The next day the soldier became sober, was struck with terror to lie under an animal of this enormous bulk. The elephant, who, no doubt, perceived his consternation, caressed him with his trunk, to remove his fears, and made him understand that he might depart freely.

The elephant falls sometimes into a sort of phrenzy, which deprives him of his tractableness, and makes him even formidable. He is commonly killed on the first symptoms of madness, for fear of mischief. Sometimes he is tied with heavy chains, in hopes that he will come to himself; but when he is in his natural state, the most acute pains cannot

cannot engage him to do any harm to persons who have not offended him. An elephant, furious with the wounds which he had received in battle at Hambour, ran through the fields, and cried out in a most hideous manner. A soldier, who, notwithstanding the warning of his companions, could not fly, perhaps, because he was wounded, remained in his way; the elephant was afraid to trample him under his feet, took him with his trunk, placed him gently on one side of the road, and continued his march. The gentlemen of the Academy of Sciences have also communicated to us some facts which they had learned from those who governed the elephant at the menagerie of Versailles; and these facts seem to deserve a place. "The elephant seemed to discern when any person made a fool of him; and he remembered the affront to be revenged of it the first opportunity. Having been baulked by a man, who feigned to throw something into his mouth, he struck him with his trunk, and broke two of his ribs; afterwards he trampled him under his feet, and broke one of his legs; and, having kneeled down, he tried to thrust his tusks into the man's belly, which, however, went into the ground on both sides of the thigh, which was not wounded. He bruised another man, by squeezing him against the wall, for a similar mockery. A painter was desirous to draw him in an extraordinary attitude, which was, to keep his trunk erect, and the mouth open. The servant of the painter, to make him remain in that attitude, threw fruits into his mouth; but after he deceived him, which provoked his indignation; and, as if he had known that the cause of this deception was the painter's desire of having him drawn, he was revenged on the master, by throwing with his trunk a great quantity of water, which spoiled the paper intended for his design."

He made less use of his strength than of his dexterity, which was such, that he untied, with great facility, a double leather string which fastened his leg, with his mouth, untying it from the buckle's tongue, and after this buckle had a small string twisted around it, with divers knots, he untied them all, without breaking any thing. One night, that he had thus disentangled himself from his leather strings, he broke open so dexterously the door of his lodge, that his governor was not awaked by the noise. He went thence into divers yards of the menagerie, breaking open the doors that were shut, and pulling down the stone-work, when the passage was too narrow for him; and thus he went into the lodges of other animals, terrifying them to such a

degree, that they ran away to hide themselves in the remotest parts of the park. In fine, to omit nothing of what may contribute to make all the natural faculties of this animal perfectly known, as well as his acquired knowledge, we shall add some facts, extracted from the most credible authors.

Of five elephants (says Tavernier), which hunters had taken, three escaped, although their bodies and their legs were fastened with chains and ropes. These men told us a very surprising circumstance, if we can believe it, which is, that when once these elephants have been caught, and eluded the snares of their adversaries, if they are compelled to go into the woods, they are mistrustful, and break with their trunk a large branch, with which they sound the ground before they put their foot upon it, to discover if there are no holes on their passage, not to be caught a second time; which made the hunters who related this singularity, despair of catching again the three elephants who had escaped. We saw the other two which they had caught; each of them was betwixt two tame elephants; and around the wild elephants were six men, holding spears. They spoke to these animals in presenting them something to eat, and telling them, in their language, *Take this, and eat it.* They had small bundles of hay, bits of black sugar, or rice boiled in water, with pepper. When the wild elephant refused to do what he was ordered, the men commanded the tame elephants to beat him, which they did immediately; one striking his forehead with his; and when he seemed to aim at a revenge against his aggressor, another struck him; so that the poor wild elephant perceived he had nothing to do, but to obey.

I have observed several times (says Edward Terry), that the elephant does many things which are rather an indication of human reasoning, than a simple, natural instinct. He does whatever his master commands him. If he orders him to frighten any person, he advances towards him with the same fury as if he would tear him to pieces; and when he comes near him, he stops short, without doing him any harm. If the master wishes to affront another, he speaks to the elephant, who takes with his trunk dirty water, and throws it at his face. The Mogul has elephants for the execution of criminals condemned to death. If their leader bids them to dispatch these wretches soon, they tear them to pieces in a moment with their feet: on the contrary, if he commands them to make these criminals languish,

guish, they break their bones one after another, and make them suffer torments as cruel as those of the wheel.

THE RHINOCEROS.] After the elephant, the rhinoceros is the most powerful of all quadrupeds. He is at least twelve feet in length, from the extremity of the snout to the tail; six or seven feet in height; and the circumference of his body is very near equal to his length; he is therefore like the elephant in bulk; and if he appears much smaller, it is because his legs are much shorter in proportion to those of the elephant; but he differs widely from that sagacious animal, in his natural faculties, and his intelligence; having received from Nature merely what she grants in common to all animals; deprived of all feeling in the skin, having no organ answering the purpose of hands, nor distinct for the sense of feeling; he has nothing instead of a trunk, but a moveable lip, in which centers all his dexterity. He is superior to other animals only in strength, size, and the offensive weapon which he carries upon his nose, and which is peculiar to him. This weapon is a very hard horn, solid throughout, and placed more advantageously than the horns of ruminating animals; these only protect the superior parts of the head and neck, whilst the horn of the rhinoceros defends all the exterior parts of the snout, and preserves the muzzle, the mouth, and the face from insult; so that the tiger attacks more readily the elephant, in seizing his trunk, than the rhinoceros, which he cannot attack in front, without running the danger of being killed; for the body and limbs are covered with an impenetrable skin; and this animal fears neither the claws of the tiger nor the lion, nor even the fire and weapons of the huntsman; his skin is a dark leather, of the same colour, but thicker and harder than that of the elephant; he does not feel the sting of flies; he cannot contract his skin; it is only folded by large wrinkles on the neck, the shoulders, and the buttocks, to facilitate the motions of the head and the legs, which are massive, and terminate in large feet, armed with three great claws. He has the head larger in proportion than the elephant; but the eyes still smaller, which he never opens entirely. The upper jaw projects above the lower; and the upper lip has a motion, and may be lengthened six or seven inches; it is terminated by a sharp edge, which enables this animal, with more facility than other quadrupeds, to gather the grass, and divide it into handfuls, as the elephant does with his trunk. This muscular and flexible lip is a sort of trunk very in-

complete, but which is equally calculated for strength and dexterity. Instead of those long ivory teeth which form the tusks of the elephant, the rhinoceros has his powerful horn, and two strong incisive teeth in each jaw. These incisive teeth, which the elephant has not, are placed at a great distance from each other in the jaws of the rhinoceros. He has, besides these, twenty-four smaller teeth, six on each side of each jaw. His ears are always erect; they are, for the form, like those of a hog, only they are larger in proportion to his body; they are the only hairy parts of it. The end of the tail is, like that of the elephant, furnished with a tuft of large bristles, very hard and very solid.

The rhinoceros which arrived in London in 1739, had been sent from Bengal. Although he was young (being but two years old), the expences of his food, and his voyage, amounted to near one thousand pounds sterling; he was fed with rice, sugar and hay. They gave him daily seven pounds of rice, mixed with three pounds of sugar; which they divided into three parts. He had also a great quantity of hay and green grass, to which he gave the preference. His drink was nothing but water, of which he drank a great quantity at once. He was of a quiet disposition, and let his manager touch him on all the parts of his body. He grew unruly when he was struck, or was hungry; and in both cases he could not be appeased without giving him something to eat. When he was angry, he leaped forward with impetuosity to a great height, beating furiously the walls with his head; which he did with a prodigious quickness, notwithstanding his heavy appearance.

This rhinoceros, when he was two years old, was not much higher than a young cow who has not yet born young; but his body was very long, and very thick. The tongue of this young rhinoceros was soft, like that of a calf; his eyes had no vivacity; they are like those of a hog in form, and are placed very low; that is, nearer the opening of the nostrils.

Mr. Parsons says, that he has observed a very particular quality in this animal; he hearkened with a sort of continual attention to any noise; so that, if he was even sleepy, employed in eating, or in satisfying other urgent wants, he started instantly, raised up his head, and gave attention till the noise had ceased.

It is certain, that some rhinoceroses have but one horn of the nose, and others two; it is not equally certain, that this variety is constant, always depending on the climate of Africa,

Africa, or the Indies; so that two distinct species may be established in these kinds of animals, in consequence of this difference. It seems, that the rhinoceroses who have but one horn, have it larger and longer than those who have two. There are single horns of three feet and a half, and perhaps of more than four feet in length, by six or seven inches in diameter at the basis; there are also double horns which are but two feet in length. Commonly, these horns are brown, or olive-colour; yet some are grey, and even white. They have only a small concavity, in form of a cup, at their basis, by which they are fastened to the skin of the nose; the remaining part of the horn is solid, and very hard. It is with this weapon that the rhinoceros is said to attack, and sometimes to wound mortally, the largest elephants, whose long legs give to the rhinoceros, who has them much shorter, an opportunity of striking them with his horn under the belly, where the skin is tender, and more penetrable; but, when he misses the first blow, the elephant throws him on the ground, and kills him.

The horn of the rhinoceros is more valued by the Indians than the ivory of the elephant; not so much on account of the matter, of which they make several works with the chissel, but for its substance, to which they attribute divers specific virtues, and medicinal properties. The white ones, as the most rare, are also those which they value most.

The rhinoceros, without being ferocious or carnivorous, or even very wild, is, nevertheless, untameable. He is of the nature of a hog, blunt and grunting, without intellects, without sentiment, and without tractableness. These animals are also, like the hog, very much inclined to wallow in the mire; they like damp and marshy places, and seldom leave the banks of rivers. They are found in Asia and Africa, in Bengal, Siam, Laos, in the Mogul dominions, in Sumatra, in Java, in Abyssinia, in Ethiopia, and about the Cape of Good Hope. But, in general, the species is not so numerous, or so universally spread, as that of the elephant. The female brings forth but one young, and at a great distance of time. In the first month, the rhinoceros is not much bigger than a large dog; he has not, when first brought forth, the horn on the nose, although the rudiment of it is seen in the foetus. When he is two years old, this horn is only an inch long; and in his sixth year, it is about ten inches; and, as some of these horns have been seen very near four feet long, it seems they grow till his middle age, and perhaps during the whole life of the animal, which
must

must be long, since the rhinoceros described by Mr. Parsons was not come to half his growth when he was two years old ; which makes it probable, that this animal lives, like a man, seventy or eighty years.

Without being useful as the elephant, the rhinoceros is very hurtful, by the prodigious devastation which he makes in the fields. The skin is the most valuable thing of this animal. His flesh is excellent, according to the taste of Indians and Negroes. Kolbe says, he has often eaten it with great pleasure. His skin makes the best and hardest leather of the world ; and not only his horn, but all the other parts of his body, and even his blood, his urine, and his excrements, are esteemed as antidotes against poison, or a remedy against several diseases ; probably, however, all those virtues are imaginary.

The rhinoceros feeds upon herbs, thistles, prickles, shrubs, and he prefers this wild food to the sweet pasture of the verdant meadows ; he is very fond of sugar-canes, and eats all sorts of corn. Having no taste whatever for flesh, he does not molest small animals, neither fears the large ones, living in peace with them all, even with the tiger, who often accompanies him, without daring to attack him : I doubt, therefore, whether the battles betwixt the elephant and the rhinoceros have any foundation ; they must, however, seldom happen, since there is no notice for war on either side ; and, besides, no sort of antipathy has been observed between these animals. Some have even been seen in captivity, living quietly together, without giving offence or provocation to each other.

The rhinoceroses do not herd together, nor march in troops, like the elephant ; they are wilder, and more solitary, and perhaps more difficult to be hunted and subdued ; they never attack men unless provoked ; but then they become furious, and are very formidable : the steel of Damascus, the scymitars of Japan, cannot make an incision in his skin ; the darts and lances cannot pierce him through : his skin even resists the balls of a musket ; those of lead become flat upon his leather, and the iron ingots cannot penetrate through it : the only places absolutely penetrable in this body armed with a cuirass, are the belly, the eyes, and round the ears ; so that huntsmen, instead of attacking this animal standing, follow him at a distance by his track, and wait to approach him for the time that he sleeps or rests himself. We have in the King's cabinet a fœtus of a rhinoceros which was sent from the island of Java, and extracted

tracted from the body of the mother. It was said, in a memorial which accompanied this present, that twenty-eight huntsmen had assembled to attack this rhinoceros; they had followed her far off for some days, one or two men walking now and then before, to reconnoitre the position of the animal. By these means they surprised her when she was asleep, and came so near in silence, that they discharged, all at once, their twenty-eight guns into the lower parts of her belly.

We have seen, that this animal has a good ear; it is also affirmed, that he has the sense of smelling in perfection; but it is pretended, he has not a good eye, and sees only before him: his eyes are so small, and placed so low, and so obliquely, they have so little vivacity and motion, that this fact needs no other confirmation. His voice, when he is calm, resembles the grunting of a hog; and when he is angry, his sharp cries are heard at a great distance. Though he lives upon vegetables, he does not ruminate; thus, it is probable, that, like the elephant, he has but one stomach, and very large bowels, which supply the office of the paunch. His consumption, though very great, is not comparable to that of the elephant; and it appears, by the thickness of his skin, that he loses less than the elephant by perspiration.

THE CAMEL AND THE DROMEDARY.] These two names do not include two different species, but only indicate two distinct breeds, subsisting from time immemorial, in the camel species. The principal, and, as may be said, the only perceptible character by which they differ, consists in the camel's bearing two hunches, or protuberances, and the dromedary only one. The latter is also much less, and not so strong as the camel; but both of them herd and copulate together; and the production from this cross breed is more vigorous, and of greater value, than the others.

This mongrel issue from the dromedary and the camel, form a secondary breed, which also mix and multiply with the first; so that in this species, as well as in that of other domestic animals, there are to be found a great variety, according to the difference of the climates they are produced in. Aristotle has judiciously marked the two principal breeds; the first (which has two hunches), under the name of the **BACTRIAN CAMEL**; and the second, under that of the **ARABIAN CAMEL**; the first are called **TURKMAN**, and the others **ARABIAN CAMELS**. This division still subsists,

with this difference only, that it appears, since the discovery of those parts of Africa and Asia which were unknown to the ancients, that the dromedary is, without comparison, more numerous and more universal than the camel; the last being seldom to be found in any other place than in Turkey, and in some other parts of the Levant; while the dromedary, more common than any other beast of his size, is to be found in all the northern parts of Africa, which extends from the Mediterranean to the Black Sea; in Egypt, in Persia, in South Tartary, and in all the northern parts of India.

The dromedary, therefore, occupies an immense tract of land, while the camel is confined to a small spot of ground; the first inhabits hot and parched regions; the second, a more moist and temperate soil. The camel appears to be a native of Arabia; for it is not only the country where there is the greatest number, but it is also most conformable to them. Arabia is the driest country in the world; and the camel is the least thirsty of all animals, and can pass several days without any drink. The land is almost in every part dry and sandy; the feet of the camel are formed to travel in sand; while, on the contrary, he cannot support himself in moist and slippery ground. Herbage and pasture are wanting to this country, as is the ox, whose place, in size, is supplied by the camel.

The Arabs regard the camel as a present from heaven, a sacred animal, without whose aid they could neither subsist, trade, nor travel. The milk of these beasts is their common nourishment; they likewise eat their flesh, especially that of the young ones, which they reckon very good. The hair of these animals, which is fine and soft, is renewed every year, and serves them to make stuffs for their clothing and their furniture. Blest with their camels, they not only want for nothing, but they even fear nothing. With them they can, in a single day, place a tract of desert, of fifty miles, between them and their enemies; and all the armies in the world would perish in the pursuit of a troop of Arabs. Let any one figure to himself a country without verdure, and without water, a burning sun, a sky always clear, plains covered with sand, and mountains still more parched, over which the eye extends, and the sight is lost, without being stopped by a single living object; a dead earth, *flayed* (if I may be allowed the expression) by the winds, which presents nothing but bones of dead bodies, flints scattered here and there, rocks standing upright or

overthrown; a desert entirely naked, where the traveller never drew his breath under the friendly shade; where he has nothing to accompany him, and where nothing reminds him of living nature; an absolute solitude, a thousand times more frightful than that of the forest (for trees appear as beings to the man who, thus desolate, thus naked, and thus lost in these void and unbounded places, looks over all the extended space as his tomb); an immensity which he in vain attempts to over-run; for hunger, thirst, and burning heat, press on him every weary moment that remains between despair and death.

Nevertheless, the Arab has found means to surmount these difficulties, and even to appropriate to himself these gaps of Nature: they serve him for an asylum; they secure his repose, and maintain him in his independence.—But why does not man know how to make use of them without abuse? This same Arab, free, independent, tranquil, and even rich, instead of respecting these deserts as the ramparts of his liberty, soils them with guilt: he traverses over them to the neighbouring nations, and robs them of their slaves and gold: he makes use of them to exercise his robberies, which, unfortunately, he enjoys more than his liberty; for his enterprizes are almost always successful: notwithstanding the caution of his neighbours, and the superiority of their forces, he escapes their pursuit, and, unpunished, bears away all that he has plundered them of.

An Arab who destines himself to this business of land piracy, early hardens himself to the fatigue of travelling: he accustoms himself to pass many days without sleep; to suffer hunger, thirst, and heat; at the same time, he instructs his camels, he brings them up, and exercises them in the same method. A few days after they are born, he bends their legs under their bellies, and constrains them to remain on the earth, and loads them, in this situation, with a weight as heavy as they usually carry, which he only relieves them from to give them a heavier. Instead of suffering them to feed at every hour, and drink when they are thirsty, he regulates their repasts, and, by degrees, increases them to greater distances between each meal, diminishing also, at the same time, the quantity of their food. When they are a little stronger, he exercises them to the course; he excites them by the example of horses, and endeavours to render them also as swift, and more robust; at length, when he is assured of the strength and swiftness of his camels, and that they can endure hunger and thirst, he then loads them

them with whatever is necessary for his and their subsistence. He departs with them, arrives unexpectedly at the borders of the desert, stops the first passenger he sees, pillages the straggling habitations, and loads his camels with his booty. If he is pursued, he is obliged to expedite his retreat; and then he displays all his own and his animals' talents. Mounted on one of his swiftest camels, he conducts the troop, makes them travel day and night, almost without stopping either to eat or drink. In this manner, he easily passes over three hundred miles in eight days; and, during all that time of fatigue and travel, he never unloads his camels, and only allows them an hour of repose, and a ball of paste each day. They often run in this manner for eight or nine days without meeting with any water, during which time they never drink; and when by chance they find a pool at some distance from their route, they smell the water at more than half a mile before they come to it. Thirst now makes them redouble their pace; and then they drink enough for all the time past, and for as long to come; for often they are many weeks in travelling; and their time of abstinence endures as long as they are upon their journey.

In Turkey, Persia, Egypt, Arabia, Barbary, &c. they use no other carriage for their merchandize than camels, which is, of all their conveyances, the most ready, and the cheapest. Merchants, and other travellers, assemble themselves in caravans, to avoid the insults and piracies of the Arabs. These caravans are often very numerous, and often composed of more camels than men. Every one of these camels is loaded according to his strength; and he is so sensible of it himself, that when a heavier load than usual is put upon him, he refuses it; by constantly remaining in his resting posture, till he is lightened of some of his burden.

Large and strong camels generally carry 1000, and even 1200 weight; the smaller only 6 or 700. In these commercial journeys, they do not travel quick; and, as the route is often seven or eight hundred miles, they regulate their stages; they only walk, and go every day ten or twelve miles; they are disburthened every evening, and are suffered to feed at liberty. If they are in a part of the country where there is pasture, they eat enough in one hour to serve them twenty-four, and to ruminate on during the whole night; but they seldom meet with pastures, and this delicate food is not necessary for them: they even seem to prefer wormwood, thistles, nettles, furze, and other thorny vegetables,

vegetables, to the milder herbs; and so long as they can find such plants to brouze on, they very easily live without any drink.

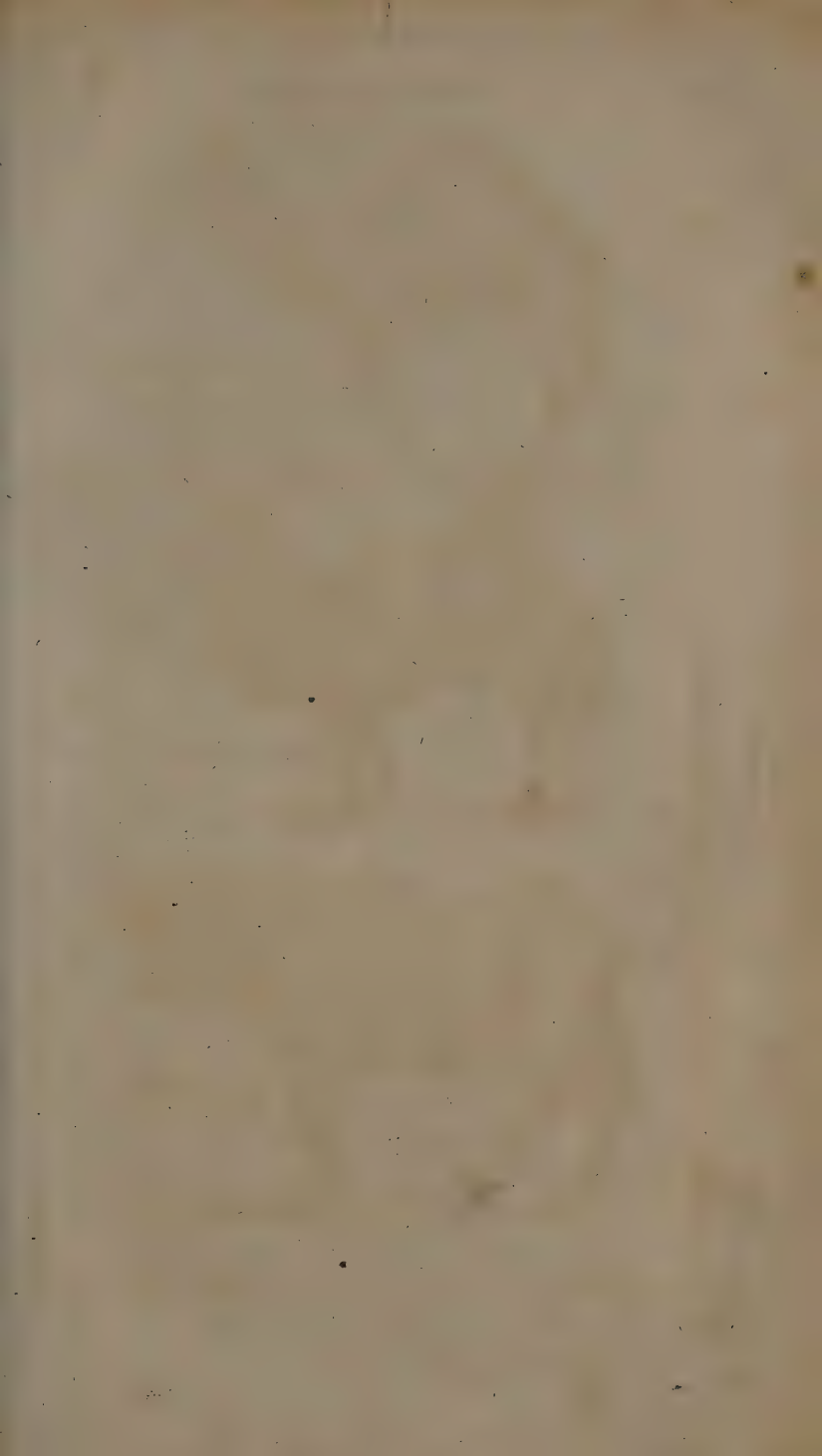
This facility with which they abstain so long from drinking, is not pure habit, but rather an effect of their formation. Independent of the four stomachs which are commonly found in ruminating animals, the camel is possessed of a fifth bag, which serves him as a reservoir to retain the water. This fifth stomach is peculiar to the camel. It is of so vast a capacity, as to contain a great quantity of liquor, where it remains without corruption, or without the other aliments being able to mix with it. When the animal is pressed with thirst, or has occasion to dilute the dry food, and to macerate it for rumination, he causes a part of this water to re-ascend into the stomach, and even to the throat, by a simple contraction of the muscles.

This animal bears about him all the marks of slavery and pain; below the breast, upon the sternum, is a thick and large callosity, as tough as horn; the like substance appears upon the joints of the legs; and although these callosities are to be met with in every camel, yet they plainly prove that they are not natural, but produced by an excessive constraint, and pain, as appears from their being often found filled with pus. It is therefore evident, that this deformity proceeds from the custom to which these animals are constrained, of forcing them, when quite young, to lie upon their stomach with their legs bent under them, and in that cramped posture to bear not only the weight of their body, but also the burdens with which they are laden. These poor animals must suffer a great deal, as they make lamentable cries, especially when they are overloaded; and, notwithstanding they are continually abused, they have as much spirit as docility. At the first sign, they bend their legs under their bodies, and, kneeling upon the ground, they are unloaded with the greatest ease, without the trouble of lifting up the load to a great height, which must happen, were they to stand upright. As soon as they are loaded, they raise themselves up again, without any assistance or support; and the conductor, mounted on one of them, precedes the whole troop, who follow in the same pace as he leads. They have neither need of whip nor spur to excite them; but, when they begin to be fatigued, their conductors support their spirits, or rather charm their weariness, by a song, or the sound of some instrument. When they want to prolong the route, or double the day's journey,

journey, they give them an hour's rest ; after which, renewing their song, they again proceed on their way for many hours more ; and the singing continues until the time that they stop. Then the camels again kneel down on the earth, to be relieved from the burden, by the cords being untied, and the bales rolled down on each side. They remain in this cramped posture, with their belly couching upon the earth, and sleep in the midst of their baggage, which is tied on again the next morning with as much readiness and facility as it was untied before they went to rest. These are, however, not their only inconveniencies : they are prepared for all these evils by one still greater ; by mutilating them by castration while young. They leave but one male for eight or ten females ; and all the labouring camels are commonly gelt : they are weaker, without doubt, than those which are not castrated ; but they are more tractable than the others, who are not only indocile, but almost furious, in the rutting time, which remains forty days, and which happens every spring of the year. The female goes with young exactly a year, and, like all other large animals, produces but one at a birth. They have great plenty of milk, which is thick, and nourishing even for the human species if it is mixed with a more than equal quantity of water. The females seldom do any labour while they are with young, but are suffered to bring forth at liberty. The profit which arises from their produce, and from their milk, perhaps, surpasses that which is got from their labour ; nevertheless, in some places, a great part of the females undergo castration, as well as the males, in order to render them more fit for labour. In general, the fatter the camels are, the more capable they are of enduring great fatigues. Their hunches appear to be formed only from the superabundance of nourishment ; for, in long journeys, where they are obliged to stint them in their food, and where they suffer both hunger and thirst, these hunches gradually diminish, and are reduced almost even ; and the eminences are only discovered by the height of the hair, which is always much longer upon these parts than upon any other part of the back.

The young camel sucks its mother a year ; and when they want to bring him up so as to make him strong and robust, they leave him at liberty to suck or graze for a longer time, nor begin to load him, or put him to labour, till he has attained the age of four years. The camel commonly lives forty or fifty years.

The





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The camel is not only of greater value than the elephant, but perhaps not of less than the horse, the ass, and the ox, all united together. He alone carries as much as two mules; he not only also eats less, but likewise feeds on herbs as coarse as the ass. The female furnishes milk a longer time than the cow; the flesh of young camels is good and wholesome, like veal; their hair is finer, and more sought after than the finest wool; there is not a thing, even to their excrements, from which some profit is not drawn; for sal ammoniac is made from their urine; their dung, when dried and powdered, serves them for litter, as it does for horses, with whom they often travel into countries where neither straw nor hay is known. In fine, a kind of turf is also made of this dung, which burns freely, and gives a flame as clear, and almost as lively, as that of dry wood; even this is another great use, especially in deserts, where not a tree is to be seen, and where, from the deficiency of combustible matters, fire is almost as scarce as water.

THE BUFFALO, THE AUROCHS, THE BISON, AND THE ZEBU.] Although the Buffalo is, at this present time, common in Greece, and tame in Italy, it was neither known by the Greeks or Romans; for it never had a name in the language of these people. The word *buffalo* even indicates a strange origin, not to be derived either from the Greek or Latin tongues. In effect, this animal is originally a native of the hottest countries of Africa and India, and was not transported and naturalized in Italy, till towards the seventh century. It is true, the ancients have spoken of an animal, as of a different species from the ox, under the name of *bubalus*; and Aristotle has mentioned the wild ox of Pæonia, which he has called *bonasus*. Both the ancients and moderns, however, have multiplied the species unnecessarily; and, from attentive observation, I am clearly of opinion, that there are but two species which are essentially different, viz. the ox, and the buffalo.

We may observe, throughout the different regions of the world, the breed of oxen differing from each other in all external appearances, according to the nature of the climate, or other circumstances; but the most remarkable difference is that which divides them into two classes, viz. the *aurochs*, or ox without a hunch on its back, and the *bison*, or hunched ox. From indubitable facts, however, we have the utmost reason to conclude, that these are no other than varieties of

the same species. The hunch, the length and quality of the hair, and the form of the horns, are the sole characters by which the bison is distinguished from the aurochs; but the hunched oxen copulate and produce with our oxen; and we likewise know, that the length and quality of the hair, in all animals, depends on the nature of the climate; and we have remarked, that, in oxen, goats, and sheep, the form of the horns is various and fluctuating. These differences, therefore, do not suffice to establish two distinct species; and, since our tame ox of Europe copulates with the hunched ox of India, we have the greatest reason to think that it would also copulate with the bison, or hunched ox of Europe. Notwithstanding this, however, we are not to be surprised, that the two kinds have not melted or coalesced into a mongrel breed, since many circumstances may have occurred to keep them asunder; and, in fact, we actually find that these kinds have subsisted till this present time, either in a free and wild, or in a tame state; and are scattered, or rather have been transported into all the climates of the earth. All the tame oxen without hunches have proceeded from the aurochs, and all with hunches are issues of the bison. In order to give a just idea of the varieties, we shall make a short enumeration of these animals, such as they are found actually to be in the different parts of the earth.

To begin with the north of Europe, the few oxen and cows which subsist in Iceland are deprived of horns, although they are of the same kind as our oxen. The size of these animals is rather relative to the plenty and quality of pasture, than to the nature of the climate. The Dutch have often brought lean cows from Denmark, which fatten prodigiously in their meadows, and which give plenty of milk. These Denmark cows are longer than ours. The oxen and cows of Ukrain, where there is excellent pasture, are said to be the largest in Europe; they are also of the same kind as our oxen.

The breed of aurochs, or ox without a hunch, inhabits the cold and temperate zones. It is not very much dispersed towards the southern countries: on the contrary, the breed of the bison, or hunched ox, fills all the southern provinces, at this present time. In the whole continent of India; the Islands of the South Seas; in all Africa, from Mount Atlas to the Cape of Good Hope, we find, I may say, nothing but hunched oxen; and it even appears, that this breed, which has prevailed in all the hot countries, has
many

many advantages over the others. These hunched oxen, like the bison, of which they are the issue, have the hair much softer, and more glossy than our oxen, who, like the auroch, are furnished but with little hair, which is of a harsh nature. These hunched oxen are also swifter, and more proper to supply the place of a horse; at the same time, that they have a less brutal nature, and are not so clumsy and stupid as our oxen; they are more tractable, and sensible which way you would lead them; they are also treated with more care in their country, than we give the finest horses in ours. The regard the Indians have for these animals is so great, as to have almost degenerated into superstition, the last mark of blind respect. The ox, as the most useful animal, has appeared to them to be the most worthy of being revered; for this purpose, they have made an idol of the object of their veneration, a kind of beneficent and powerful divinity; for we are desirous of rendering all we respect, great, and capable of doing much good, or much harm.

These hunched oxen, perhaps, vary again more than ours, in the colours of the hair, and the figure of the horns. The handsomest are all white, like the oxen of Lombardy; there are also some that are destitute of horns; there are others who have them very much elevated, and others so bent down, that they are almost pendant; it even appears, that we must divide this first kind of bisons, or hunched oxen, into two secondary kinds; the one very large, and the other very small; and this last is that of the *zebu*; both of them are found nearly in the same climates; and both are equally mild and easy to drive; both have soft hair, and a hunch on the back. This hunch does not depend on the conformation of the spine, nor on the bones of the shoulder; it is nothing but an excrescence, a kind of wen, a piece of tender flesh, as good to eat as the tongue of an ox. The wens of some oxen weigh about forty or fifty pounds; others have them much smaller; some of these oxen have also prodigious horns for their size; there is one in the French King's cabinet, which is three feet and an half in length, and seven inches in diameter at the base. Many travellers affirm, they have seen them of a capacity sufficient to contain fifteen, and even twenty pints of water.

Thus all the southern parts of Africa and Asia are inhabited with hunched oxen, or bisons, among which a great variety is to be met with in respect to size, colour, shape of the horns, &c. On the contrary, all the northern countries

of these two parts of the world, and Europe entirely, comprehending even the adjacent islands, to the Azores, are only inhabited by oxen without a hunch, who derive their origin from the aurochs. The bison, or wild hunched ox, is stronger, and much larger than the tame ox of India; it is also sometimes smaller; but that depends only on the quantity of food. At Malabar, at Abyssinia, at Madagascar, where the meadows are naturally spacious and fertile, the bisons are all of a prodigious size. In Africa and Arabia Petræa, where the land is dry, the zebus, or bisons, are of the smallest stature.

Every part of South America is inhabited by oxen without hunches, which the Spaniards, and other Europeans, have successfully transported. These oxen are multiplied, and are only become less in these new countries. In all the northern parts, as far as Florida, Louisiana, and even as far as Mexico, the bisons, or hunched oxen, are to be found in great numbers. These bisons, which formerly inhabited the woods of Germany, Scotland, and other of our northern countries, have probably passed from one continent to the other, and are become, like other animals, smaller in this new world; and as they are habituated to climates more or less cold, they have preserved their coat more or less warm; their hair is longer and thicker; the beard is longer at Hudson's Bay than at Mexico; and, in general, this hair is softer than the finest wool.

Thus the wild and the tame ox, the European, the Asian, the American, and the African ox, the bonafus, the aurochs, the bison, and the zebu, are all animals of one and the same species, who, according to the climates, food, and different usage they have met with, have undergone all the variations we have before explained. The ox, as the most useful animal, is also the most universally dispersed. He appears ancient in every climate, tame among civilized nations, and wild in desert or unpolished countries; he supports himself by his own strength when in a state of nature, and has never lost the qualities relative to the service of man. The young wild calves which are taken from their mothers in India and Africa, have, in a short time, become as tractable as those which are the issue of the tame kind; and this natural conformity is another striking proof of the identity of the species.

If it be asked, which of the two kinds, the aurochs or the bison, claims the first place? it appears to me, that a satisfactory answer may be drawn from the facts we have just

just laid down. The hunch or wen of the bison is probably no other than an accidental character, which is defaced and lost in the mixture of the two kinds. The aurochs, or ox without an hunch, then, is the most powerful and predominant of the two; for, if it was the contrary, the hunch, instead of disappearing, would extend and remain upon every one of this mixed breed. What confirms and proves still more the identity of the species of bison and aurochs, is, that the bisons, or hunch-backed oxen, in the north of America, have so strong a smell, that they have been called *musk oxen* by the greatest number of travellers; and, at the same time, we find, by the accounts of observing people, that the aurochs, or wild ox of Prussia and Livonia, has the smell of musk, like the bison of America.

There remain, therefore, but two species, the buffalo and the ox, out of all the names placed at the head of this chapter; to each of which the ancient and modern naturalists have given a separate and distinct species. These two animals, although greatly resembling each other, both tame, and often living under the same roof, and fed in the same meadow, yet, when brought together, and even excited by their keepers, have ever refused to unite and copulate together; their nature is more distant than that of the ass is from the horse; there even appears to be a strong antipathy between them; for it is affirmed, that cows will not suckle the young buffaloes; and the female buffalo refuses the same kindness to the other's calves. The buffalo is of a more obstinate nature, and less tractable than the ox; he obeys with greater reluctance, and his temper is more coarse and brutal; like the hog, he is one of the filthiest of all tame animals, as he shews by his unwillingness to be cleaned and dressed; his figure is very clumsy, and forbidding; his look stupidly wild; he carries his tail in an ignoble manner, and his head in a very bad posture, almost always inclined towards the ground; his voice is a hideous bellowing, with a tone much stronger, and more hoarse than that of the bull; his legs are thin, his tail bare, and his physiognomy dark, like his hair and skin. He differs externally from the ox, chiefly in the colour of his hide; and this is easily perceived under the hair, with which he is but sparingly furnished; his body is likewise thicker and shorter than that of the ox; the legs are longer, and proportionably much less; the horns not so round, black, and partly compressed, with a tuft of hair frizzled over his forehead; his hide is likewise thicker and harder than that of the ox; his flesh is black and hard,

and not only disagreeable to the taste, but to the smell ; the milk of the female is not so good as that of the cow ; nevertheless, she yields a greater quantity. In hot countries, almost all the cheese is made of buffaloes milk. The flesh of the young buffaloes, though killed during the suckling time, is not good. The hide alone is of more value than all the rest of the beast, whose tongue is the only part that is fit to eat. This hide is firm, light, and almost impenetrable. As these animals, in general, are larger and stronger than the oxen, they are very serviceable in the plough ; they draw well, but do not carry burdens ; they are led by the means of a ring passed through their nose. Two buffaloes harnessed, or rather chained to a waggon, will draw as much as four strong horses. As they carry their tails and their heads naturally downwards, they employ the whole force of their body in drawing ; and this heavy mass greatly surpasses that of a horse, or a labouring ox.

The form and thickness of the buffalo alone are sufficient to indicate that he is a native of the hottest countries. The largest quadrupeds belong to the torrid zone in the Old Continent ; and the buffalo, for his size and thickness, ought to be classed with the elephant, the rhinoceros, and the hippopotamus. The camel is more elevated, but slenderer, and is also an inhabitant of the southern countries of Africa and Asia : nevertheless, the buffaloes live and multiply in Italy, in France, and in other temperate provinces. Those that are in the French King's menagerie, have brought forth two or three times. The female has but one at a time, and goes about twelve months ; which is another proof of the difference between this species and that of the cow, who only goes nine months. It appears also, that these animals are gentler and less brutal in their native country ; and the hotter the climate is, the more tractable is their nature. In Egypt they are more so than in Italy ; and in India they are more so than in Egypt. Those of Italy have also more hair than those of Egypt, and those of Egypt more than those of India. Their coat is never entirely covered, because they are natives of hot countries ; and, in general, large animals of this climate have either no hair, or else very little.

There are a great number of wild buffaloes in the countries of Africa and India, which are watered with many rivers, and furnished with large meadows. These wild buffaloes go in droves, and make great havock in cultivated lands ; but they never attack the human species, and will
not

not run at them, unless they are wounded; at which time they are very dangerous; for they make directly at their enemy, throw him down, and trample him to death under their feet; nevertheless, they are greatly terrified at the sight of fire, and are displeased at a red colour.

The buffalo, like all other animals of southern climates, is fond of bathing, and even of remaining in the water; he swims very well, and boldly traverses the most rapid floods. As his legs are longer than those of the ox, he runs also quicker upon land. The Negroes in Guinea, and the Indians in Malabar, where the wild buffaloes are very numerous, often hunt them. They neither pursue them nor attack them openly, but, climbing up the trees, or hiding themselves in the woods, they wait for them, and kill them, the buffaloes not being able, without much trouble, to penetrate these forests, on account of the thickness of their bodies, and the impediment of their horns, which are apt to entangle in the branches of the trees. These people are fond of the flesh of the buffalo, and gain great profit by vending their hides and their horns, which are harder and better than those of the ox. The animal that is called in Congo *empacapa*, or *pacapa*, though very ill described by travellers, seems to me to be the buffalo; as that which they have spoken of, under the name of *empa-bunga*, or *impalunca*, in the same country, may possibly be the bubalus.

C H A P. XVII.

Of the Mufflon, and other Sheep—The Axis—The Tapir—The Zebra—The Hippopotamus—The Elk, and Rein Deer.

THE MUFFLON, AND OTHER SHEEP.] THE breed of sheep, though perhaps originally all of the same species, yet are found to be very different in different countries. Our domestic sheep is only to be met with in Europe, and in some of the most temperate provinces in Asia, and if transported into Guinea, loses its wool, and is covered with hair. It increases there but little, and its flesh has no longer the same taste: it cannot also subsist in cold countries; but even in those, and in Iceland, a breed of sheep is to be found, who have many horns, short tails, harsh and thick wool, under which, as in almost every animal in the north, is a second lining, of a softer, finer, and thicker wool.

wool. In warm climates, some are covered with wool, others with hair, and a third kind with hair mixed with wool. The first kind of sheep of those countries, is that commonly called the Barbary or Arabian sheep, which entirely resembles the tame kind, excepting in the tail, which is very much loaded with fat, is often more than a foot broad, and weighs upwards of twenty pounds. As for external appearance, this sheep has nothing remarkable, but the tail, which he carries as if a pillow was fastened to his hinder parts. Among this kind of broad-tailed sheep, there are some whose tails are so long and heavy, that the shepherds are obliged to fasten a small board, and wheels to them, in order to support it as they walk along. In the Levant, these sheep are clothed with a very fine wool. In the hotter countries, as Madagascar, and East India, they are clothed with hair. The superabundance of fat, which in our sheep fixes upon the reins, in these sheep descends under the vertebræ of the tail; the other parts of the body are less charged with it than in our fat sheep. This variety is to be attributed to the climate, the food, and the care of mankind; for these broad, or long-tailed sheep, are tame, like those of our country; and they even demand much more care and management. This breed is much more dispersed than ours; they are commonly met with in Turkey, Persia, Syria, Egypt, Barbary, Ethiopia, and Madagascar; and even as far as the Cape of Good Hope.

In the islands of the Archipelago, and chiefly in the island of Candia, there is a breed of sheep which Bellon has given the figure and description of, under the name of *strepichoros*. This sheep is of the make of our common sheep: it is, like that, clothed with wool, and only differs from it by the horns, which are straight, and in spiral furrows.

In short, in the hottest countries of Africa and India, there is a breed of large sheep, which has rough hair, short horns, hanging ears, and a kind of tuft under the tail; Leon Africanus, and Marmol, call it *adamain*; and it is known to the naturalists by the names of the *Senegal ram*, the *Guinea ram*, and the *Angola sheep*, &c. He is tame like ours, and, like him, subject to variety. These, though different in themselves by particular characters, resemble each other so much in other respects, that we can scarcely doubt but they are of the same kind.

In considering, therefore, according to the difference of climate, the sheep which are purely tame, we find,

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1. The sheep of the north, who have many horns, and whose wool is rough and very thick; and the sheep of the island of Gothland, Muscovy, and many other parts of the north of Europe, whose wool is thick, and who appear to be of the same breed.

2. Our sheep, whose wool is very good and fine in the mild climates of Spain and Persia, but in hot countries changes to a rough hair. We have already observed, this conformity in the influence of the climates of Spain and Chorasan, a province of Persia, on the hair of cats, rabbits, hares, &c. it acts in the same manner upon the wool of sheep, which is very fine in Spain, and still finer in this part of Persia.

3. The broad-tailed sheep, whose wool is also very fine in temperate countries, such as Persia, Syria and Egypt; but which, in hot countries, changes into a hair more or less rough.

4. The sheep *strepichoros*, or Cretan sheep, who resemble ours both in wool and make, excepting the horns, which are straight and furrowed.

5. The *adimain*, or the great sheep of Senegal and India, which in no part is covered with wool, but, on the contrary, is clothed with hair, which is longer or shorter, rougher or smoother, according to the heat of the climate. All these sheep are only varieties of one and the same species, and certainly would copulate one with the other, since the goat, whose species is farther distant, copulates with our sheep, as we are assured from experience. But none of these tame sheep have the characters of an original species. In the mountains of Greece, in the islands of Cyprus, Sardinia, Corsica, and in the deserts of Tartary, the animal which we call the *mufflon*, is still to be found. It appears to us, to be the primitive stock of all sheep. He lives in a state of nature, and subsists and multiplies without the help of man; he resembles the several kinds of tame sheep, more than any other animal; he is livelier, stronger, and swifter than they are; his head, forehead, eyes, and face, are like the ram's; he resembles him also in the form of the horns, and in the whole habit of body. In short, he copulates with the tame sheep, which alone is sufficient to demonstrate, that he is of the same species, and the primitive stock of the different breeds.

The only disagreement betwixt the *mufflon* and our sheep is, that the first is covered with hair instead of wool; but we have observed, that, even in tame sheep, the wool is not an essential character, but a production of a temperate climate.

climate. Hence, it is not astonishing, that the original, or primitive and wild sheep, who has endured cold and heat, lived and increased, without shelter, in the woods, is not covered with wool, which he would soon be deprived of among the thickets and thorny bushes. Besides, when a he-goat is coupled with a tame sheep, the production is a kind of wild mutton, a lamb covered with hair, and not a barren mule, but a mungrel, which returns to the original species, and which appears to indicate, that our goats, and tame sheep, have something common to them both in their origin.

THE AXIS.] This animal being only known by the vague names of the *hind* of *Sardinia*, and the *deer* of the *Ganges*, we have thought it necessary to preserve the name which Bellon has given to him, and which he borrowed from Pliny. The axis is of the small number of ruminating animals who wear horns, like the stag. He has the shape and swiftness of the fallow-deer; but what distinguishes him from the stag, and fallow-deer, is, that his body is marked with white spots, elegantly disposed, and separated one from another, and that he is a native of hot countries; while the stag and deer have their coat of an uniform colour, and are to be met with in greater numbers, in cold countries and temperate regions, than in hot climates.

The gentlemen of the Academy of Sciences have only given him the name of the *Sardinian hind*, because, very probably, they received that name from the royal menagerie; but there is nothing indicated of this animal's being a native of *Sardinia*; no author has ever mentioned, that he exists in that island like a wild animal; but, on the contrary, we see, by examining authors, that he is found in the hottest countries of *Asia*.

We have already remarked, that there is no species which approaches so near to another, as that of the deer to the stag; nevertheless, the axis appears to be an intermediate mixture between the two. He resembles the deer in the size of his body, length of his tail, and his coat, which is the same during his whole life: he only essentially differs from that animal in his horns, which nearly resemble those of the stag. The axis, therefore, may possibly be only a variety depending on the climate, and not a different species from the deer; for, although he is a native of the hottest countries of *Asia*, he supports, and easily multiplies in *Europe*. There are many herds of them in the menagerie of

of Versailles; but it has never yet been observed, that they mix either with the deer or with the stags; and this is the cause of our presuming, that it was not a variety of one or the other, but a particular and mediate species between the two.

The TAPIR, or the ANTA, is the largest animal in America, where, as we have said, living Nature seems to be lessened, or rather has not had time to arrive at its greatest dimensions. The animals also of South America, which alone properly and originally belong to this New Continent, are almost all without defence, without horns, and without tails; their bodies and their limbs are unproportioned; and some, as the sluggish and crawling animals, &c. are of so miserable a nature, that they scarcely have the faculties of moving or of eating; they drag on, with pain, a languishing life, in the solitude of a desert, and cannot subsist in the inhabited world, where man and powerful animals would have soon destroyed them.

The tapir is of the size of a small cow, or zebu, but without horns, and without a tail; the legs are short; the body crooked, like that of the hog; wearing, in his youth, a coat like that of the stag, and afterwards, uniform spots, of a dark brown colour; his head is thick and long, with a kind of trunk, like the rhinoceros; he has ten incisive teeth, and ten grinders, in each jaw; a character which separates him entirely from the ox, and other ruminating animals.

The tapir appears to be a dull and dark animal, who never stirs out but in the night, and delights in the water, where he oftener lives than upon land. He is chiefly to be found in marshes, and seldom goes far from the borders of rivers or lakes. When he is threatened, pursued, or wounded, he plunges into the water, and remains there till he has got to a great distance before he re-appears. These customs, which he has in common with the hippopotamus, have made some naturalists imagine him to be of the same species; but he differs as much from him in nature, as he is distant from him in climate. To be assured of this, there needs no more than to compare the descriptions we have recited, with those we have given of the hippopotamus. Although the tapir inhabits the water, he does not feed upon fish; and, although his mouth is armed with twenty sharp and incisive teeth, he is not carnivorous: he lives upon plants and roots, and does not make use of what Nature has

armed.

armed him with against other animals. He is of a mild and timid nature, and flies from every attack or danger; his legs are short, and his body massive; notwithstanding which, he runs very swift, and swims still better than he runs. He commonly goes in company, and sometimes in droves. His flesh is of a very firm texture, and so bound together, that it often resists a bullet; it is insipid and coarse; nevertheless the Indians eat it. This animal is commonly found in Brasil, Paraguay, Guiana, and in all the extent of South America, from the extremity of Chilo to New Spain.

The ZEBRA is perhaps the handsomest, and most elegantly clothed of all quadrupeds. He has the shape and the graces of the horse, the swiftness of the stag, and a striped robe of black and white, alternately disposed, with so much regularity and symmetry, that it seems as if Nature had made use of the rule and compass to paint it. These alternate bands of black and white, are so much the more singular, as they are strait, parallel, and very exactly divided, like a striped stuff; and as they, in other parts, extend themselves not only over the body, but over the head, the thighs, the legs, and even the ears and the tail; so that, at a distance, this animal appears as if he was surrounded with little fillets, which some person had disposed, in a regular manner, over every part of the body. In the females, these bands are alternately black and white; in the male, they are black and yellow, but always of a lively and brilliant mixture, upon a short, fine, and thick hair, the lustre of which still more increases the beauty of the colours. The zebra is, in general, less than the horse, and larger than the ass; and, although it has often been compared to those two animals, and called the *wild horse*, and the *striped ass*, it is a copy neither of the one nor the other, and might rather be called their model, if all was not equally original in Nature, and if every species had not an equal right to creation.

The zebra is not the animal the ancients have indicated under the name *onagra*. There exists in the Levant, the eastern parts of Asia, and in the northern parts of Africa, a beautiful race of asses, who, like the finest horses, are natives of Arabia. This race differs from the common, by the size of the body, the slenderness of the legs, and the lustre of the hair; they are of an uniform, but commonly of a fine mouse colour, with a black cross upon the back and the shoulders; and sometimes they are of a bright grey colour, with a flaxen cross. The zebra is also of a different climate from

from the onagra, and is only to be met with in the most eastern and the most southern parts of Africa, from Ethiopia to the Cape of Good Hope, and thence to Congo; it exists neither in Europe, Asia, nor America, nor even in all the northern parts of Africa; those which some travellers tell us they have seen at the Brasils, have been transported thither from Africa; those which others are recounted to have seen in Persia, and in Turkey, have been brought from Ethiopia; and, in short, those that we have seen in Europe, are almost all from the Cape of Good Hope. This point of Africa is their true climate, their native country, and where the Dutch have employed all their cares to subject them, and to render them tame, without having been hitherto able to succeed. That which we have seen, and which has served for the subject of our description, was very wild when he arrived at the royal menagerie in France; and he was never entirely tamed; nevertheless, he has been broken for the saddle; but there are precautions necessary: two men held the bridle, while a third was upon him. His mouth is very hard; his ears so sensible, that he winces whenever any person goes to touch them. He was restive, like a vicious horse, and obstinate as a mule; but perhaps the wild horse, and the onagra, are not less intractable; and there is reason to believe, that, if the zebra was accustomed to obedience and tameness, from his earliest years, he would become as mild as the ass and the horse, and might be substituted in their room.

[THE HIPPOPOTAMUS.] Although this animal has been celebrated from the earliest ages, it was, notwithstanding, but imperfectly known to the ancients. It is only towards the sixteenth century, that we had some precise indications on the subject.

In comparing the descriptions which we have observed in different travellers, the hippopotamus appears to be an animal whose body is longer and thicker than that of the rhinoceros; but his fore legs are much shorter. His head is short and thick in proportion to the body. He has no horns, neither on the nose like the rhinoceros, nor on the head like ruminating animals. His cry, when hurt, approaches as near to the neighing of a horse, as the bellowing of the buffalo; but his usual voice resembles the neighing of a horse, from which, however, he differs in every other respect; and this fact, we may presume, has been the sole reason for giving him the name of *hippopotamus*.

tamus, which signifies a *river-horse*; as the howling of the lynx, which resembles that of the wolf, has occasioned him to be called the *stag-like wolf*. The incisive teeth of the hippopotamus, and especially the two canine teeth of the lower jaw, are very long, very strong, and of so hard a substance, that they strike fire with a piece of iron. This is probably what has given rise to the fable of the ancients, who have reported that the hippopotamus vomited fire. These canine teeth of this animal are so white, so clean, and so hard, that they are preferable to ivory, for making artificial teeth. The incisive teeth of the hippopotamus, especially those of the lower jaw, are very long, cylindrical, and furrowed. The canine teeth, which are also very long, are crooked, prismatic and sharp, like the tusks of a boar. The molares are square, or rather longer on one side than the other, nearly like the grinders of a man, and so thick, that a single one weighs more than three pounds. The largest of the incisive, or the canine teeth, are twelve, and even sixteen inches in length, and sometimes weigh twelve or thirteen pounds each.

The male hippopotamus is about six feet nine inches long, from the extremity of the muzzle to the beginning of the tail; fifteen feet in circumference, and six feet and an half in height. His legs are about two feet ten inches long; the length of the head, three feet and an half, and eight feet and an half in circumference; the width of the mouth, two feet four inches; and the large teeth more than a foot long.

Thus powerfully armed, with a prodigious strength of body, he might render himself formidable to every animal; but he is naturally gentle, and is otherwise so heavy and slow, that he cannot possibly catch any other quadruped in the chace. He swims quicker than he runs, pursues the fish, and makes them his prey. He delights much in the water, and stays there as willingly as upon land; notwithstanding which, he has no membranes between his toes like the beaver and otter; and it is plain, that the great ease with which he swims, is only owing to the great capacity of his body, which only makes bulk for bulk, and is nearly of an equal weight with the water. Besides, he remains a long time under water, and walks at the bottom as well as he does in the open air. When he quits it to graze upon land, he eats sugar-canes, rushes, millet, rice, roots, &c. of which he consumes and destroys a great quantity, and does much injury to cultivated lands; but, as he is more timid
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upon earth than in the water, he is very easily driven away; and, as his legs are short, he cannot save himself well by flight, if he is far from any water. His resource, when he finds himself in danger, is to plunge himself into the water, and go a great distance before he re-appears. He commonly retreats from his pursuers; but if he is wounded, he becomes irritated, and, immediately facing about with great fury, rushes against the boats, seizes them with his teeth, often tears pieces out of them, and sometimes sinks them under water. "I have seen," says a traveller, "an hippopotamus open his mouth, fix one tooth on the side of a boat, and another to the second plank under the keel; that is, four feet distant from each other, pierce the side through and through, and in this manner sink the boat to the bottom. I have seen another, lying by the side of the sea-shore, upon which the waves had driven a shallop heavily laden, which remained upon his back dry, and which was again washed back by another wave, without the animal appearing to have received the least injury. When the Negroes go a fishing in their canoes, and meet with an hippopotamus, they throw fish to him; and then he passes on, without disturbing their fishery any more. He injures most when he can rest himself against the earth; but, when he floats in the water, he can only bite. Once, when our shallop was near shore, I saw one of them get underneath it, lift it above water upon his back, and overset it, with six men who were in it; but fortunately they received no hurt."

"We dare not," says another traveller, "irritate the hippopotamus in the water, since an adventure happened, which was near proving fatal to three men. They were going in a small canoe, to kill one in a river where there was about eight or ten feet water. After they had discovered him walking at the bottom, according to his custom, they wounded him with a long lance, which so greatly enraged him, that he rose immediately to the surface of the water, regarded them with a terrible look, opened his mouth, and, at one bite, took a great piece out of the side of the canoe, and had very nearly overturned it; but he re-plunged, almost directly, to the bottom of the water."

These animals are only numerous in some parts of the world: it even appears, that the species is confined to particular climates, and seldom to be met with but in the rivers of Africa. Dutch travellers say, that they bear three or four young ones; but this appears to me very suspicious:

as the hippopotamus is of an enormous bulk, he is in the class of the elephant, the rhinoceros, the whale, and all other great animals, who bring forth but one ; and this analogy appears to me more certain than all the testimonies that they have exhibited.

THE ELK, AND THE REIN-DEER.] Although the elk and the rein-deer are two animals of different species, we have thought proper to unite them, because it is scarcely possible to write the history of the one, without borrowing a great deal from the other.

It appears, by positive testimonies, that the rein-deer formerly existed in France, at least in the high mountains, such as the Pyrenean, and, since that time, has been destroyed like the stags, who were heretofore common in this country. It is certain, that the rein-deer is now actually to be found only in the most northern countries ; we also know, that the climate of France was formerly much more damp and cold, occasioned by the number of woods and morasses, which are no longer to be seen. Gaul, under the same latitude as Canada, was, two thousand years ago, what Canada is at this present time ; that is, a climate cold enough for those animals to live in.

The elk and the rein-deer, then, are only found in the northern countries ; the elk on this, and the rein-deer on the other, side of the polar circle in Europe and in Asia. We find them in America in the highest latitudes, because the cold is greater there than in Europe. The rein-deer can bear even the most excessive cold. He is found in Spitsbergen ; he is common in Greenland, and in the most northern parts of Lapland : thus also, in the most northern parts of Asia, the elk does not approach so near the pole ; he inhabits Norway, Sweden, Polonia, Russia, and all the provinces of Siberia and Tartary, with the north of China. We again find him by the name of *original*, and the rein-deer under that of *caribou*, in Canada, and in all the northern part of America.

We may form a sufficiently just idea of the elk and the rein-deer, by comparing them with the stag. The elk is larger, thicker, and stands more erect upon his legs ; his neck is shorter, his hair longer, and his antlers wider and heavier than those of the stag ; the rein-deer is shorter and more squat ; his legs are smaller and thicker, and his feet wider ; the hair very thickly furnished, and his antlers much longer, and divided into a greater number of branches, with
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flat terminations ; while those of the elk are only (if the expression is allowable) cut or broached at the edges ; both have long hair under the neck, and both have short tails, and ears much longer than the stag ; they do not leap or bound like the roe-bucks ; but their pace is a kind of trot, so easy and quick, that they go over almost as much ground, in the same time as the stags do, without being so much fatigued ; for they can trot in this manner, for a day or two. The rein-deer lives upon the mountains ; the stag only dwells in low lands and damp forests ; both go in herds, like the stags, and both can be easily tamed, but the rein-deer with greater ease than the elk ; the last, like the stag, has not lost his liberty, while the rein-deer is become domestic among the unenlightened part of mankind. The Laplanders have no other beast. In this icy climate, which only receives the oblique rays of the sun, where there is a season of night as well as of day, where the snow covers the earth from the beginning of autumn to the end of spring, and where the verdure of the summer consists in the bramble, juniper and moss, could man form any idea but of famine ? The horse, the ox, the sheep, all our useful animals, find no subsistence there, nor can resist the rigour of the cold : he has been obliged to search among the inhabitants of the forest, for the least wild and most profitable animals. The Laplanders have done what we ourselves should do, if we were to lose our cattle : we should then be obliged to tame the stags and the roe-bucks of the forests, to supply their place ; and I am persuaded we should gain our point, and we should presently learn to draw as much utility from them as the Laplanders do from the rein-deer. We ought to be sensible, by this example, how far Nature has extended her liberality towards us. We do not make use of all the riches which she offers us : the fund is much more immense than we imagine it. She has bestowed on us the horse, the ox, the sheep, and all our other domestic animals, to serve us, to feed us, and to clothe us ; and she has, besides, species in reserve, which would be able to supply this defect, and which would only require us to subject them, and to make them useful to our wants. Man does not sufficiently know what Nature can do, nor what can be done with her. Instead of seeking for what he does not know, he likes better to abuse her in what he does know.

In comparing the advantages which the Laplanders derive from the tame rein-deer, with those which we derive from our domestic animals, we shall see that this animal is

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worth two or three of them : he is used, as horses are, to draw sledges and other carriages ; he travels with great speed and swiftness ; he easily goes thirty miles a day, and runs with as much certainty upon frozen snow as upon the mossy down. The female affords milk more substantial, and more nourishing, than that of the cow ; the flesh is very good to eat ; his coat makes an excellent fur ; and his dressed hide becomes a very supple and very durable leather. Thus the rein-deer alone affords all that we derive from the horse, the ox, and the sheep.

The antlers of the rein-deer are larger, more extended, and divided into a greater number of branches, than those of the stag. His food, in the winter season, is a white moss, which he finds under the snow, and which he ploughs up with his horns, or digs up with his feet.

In summer, he lives upon the buds and leaves of trees, rather than herbs, which his forward-spreading antlers will not permit him to browse on with facility. He runs upon the snow, and sinks but little, on account of his broad feet. These animals are mild ; and they bring them up in herds, which turns out greatly to the profit of their keepers. The richest Laplanders have herds of four or five hundred head of rein-deer, and the poor have ten or twelve. They lead them to pasture, and re-lead them to the stable, or shut them up in parks during the night, to shelter them from the outrages of the wolves. If they attempt to change their climate, they die in a short time. Formerly, Steno, prince of Sweden, sent six to Frederick, duke of Holstein ; and, of later date, in 1533, Gustavus, king of Sweden, had ten brought over to Prussia, both males and females : all perished, without producing any young, either in a domestic, or in a free state.

There are both wild and tame rein-deer in Lapland. In the time the heat is upon the tame females, they sometimes let them loose, to seek the wild males ; and, as these wild males are more robust, and stronger than the tame, the issues of this mixture are preferred for harness. These rein-deer are not so gentle as the others ; for they not only sometimes refuse to obey those who guide them, but they often turn furiously upon them, attack them with their feet, so that there is no other resource than to cover themselves from their rage by the sledge, until the fury of the beast is subsided. This sledge is so light, that they can easily manage it, and cover themselves with it. The bottom of it is lined with the skins of young rein-deers ; the hairy side is turned against the

the snow, so that the sledge glides easily forwards, and recoils less on the mountains. The harness of the reindeer is only a thong of the hide, with the hairs remaining on it, round the neck, whence it descends towards the breast, passes under the belly, between the legs, and is fastened to a hole which is in the fore part of the sledge. The Laplander has only a single cord by which to guide the animal, and which he throws indifferently upon the back of the beast, sometimes on one side, and sometimes on the other, according as he would direct him to the right or left. They can travel four or five miles an hour; but the quicker this method of travelling is, the more it is inconvenient; a person must be well accustomed to it, and travel often, to be able to direct this sledge, and prevent it from turning over.

The rein-deers have outwardly many things in common with the stags; and the formation of the interior part is, if the expression is allowable, the same. The rein-deer sheds his antlers every year like the stag, and, like him, is very good venison. The females, both of the one and of the other species, go eight months with young, and produce but one at a birth. The young rein-deer follows his mother during the first two or three years, and does not attain his full growth till about the age of four or five. It is at this age, that they begin to dress and exercise them for labour.

The rein-deers are all very spirited, and very difficult to manage; they therefore make use of only those which are castrated, among which they chuse the liveliest and the swiftest to draw their sledges, and the more heavy to travel with their provision and baggage at a slower pace. These animals are troubled with an insect, called the gad-fly, during the summer season, which, burrowing under their skins the preceding summer, deposit their eggs; so that the skin of the rein-deer is often so filled with small holes, that an incurable disorder is brought on.

The herds of this species require a great deal of care. The rein-deer are subject to elope, and voluntarily renew their natural liberty: they must be closely attended, and narrowly watched; they cannot lead them to pasture but in open places; and, in case the herd is numerous, they have need of many persons to guard them, to recall them, and to run after them, if they stray. They are all marked, that they may be known again; for it often happens, that they

stray in the woods, or mix among another herd. In short, the Laplanders are continually occupied in the care of their rein-deer, which constitute all their wealth.

The rein-deer is the only animal of this species the female of which has horns like the male; and the only one also which sheds his horns, and renews them again, notwithstanding his castration; for, in stags, fallow-deer, and roe-bucks, who have undergone this operation, the head of the animal remains always in the same state in which it was in the moment it was castrated.

Another singularity, which we must not omit, and which is common to the rein-deer and the elk, is, that when these animals run, or quicken their pace, their hoofs, at every step, make a crackling noise, as if all the joints of their legs were disjointing. It is this noise, or perhaps the scent, which informs the wolves of their approach, who run out to meet and seize them; and, if the wolves are many in number, they very often conquer. The rein-deer is able to defend himself against a single wolf, not, as may be imagined, with his horns (for they are rather of disservice to him than of use), but with his fore-feet, which are very strong, and with which he strikes with such force, as to stun the wolf, or drive him away; after which he flies with such speed, as to be no longer in danger of being overtaken. A more dangerous, though a less frequent, and less numerous enemy than the wolf, is the *rosomack*, or *glutton*. This animal, who is more voracious, but heavier than the wolf, does not pursue the rein-deer, but climbs and conceals himself in a tree, and waits the arrival of his prey. As soon as he sees him within his reach, he rushes upon him, and, fastening himself with his nails upon his back, and tearing his head or neck with his teeth, never quits him till he has killed him. He makes the like attack, and uses the same stratagems, to conquer the elk, who is stronger, and more powerful than the rein-deer.

The elk and rein-deer are both among the number of ruminating animals.

A tame rein-deer lives only to the age of fifteen or sixteen years; but it is to be presumed, that the life of the wild rein-deer is of much longer duration. This animal, being four years before he arrives at his full growth, must live twenty-eight or thirty years, when he is in his natural state. The Laplanders hunt the wild rein-deers by different methods, according to the difference of seasons. In their rut-
ting

ing time, they make use of a tame female to attract them. They kill them with the musket, or with the bow and arrow, and draw the bow with such great strength, that, notwithstanding the thickness of the hair, and the firmness of the hide, they very often kill one of these beasts with a single arrow.

In general, the elk is a much larger and a much stronger animal than the stag and the rein-deer. His hair is so rough, and his hide so hard, that the musket-ball cannot penetrate it. His legs are very firm, with so much motion and strength, especially in the fore feet, that he can kill a man by one single stroke of his foot; nevertheless, he is hunted nearly as we hunt the stag; that is, with men and dogs. It is affirmed, that, when he is touched with the lance, or pursued, it happens that he often falls down all at once, without either being pulled down or wounded. From this circumstance, some have presumed he was subject to the epilepsy; and on this presumption (which is not well founded, (since fear alone might be able to produce the same effect), this absurd consequence has been drawn, that his hoof is a remedy for the epilepsy, and even preserves persons from it.

As there are very few people in the northern parts of America, all animals, and particularly elks, are in greater numbers than in the north of Europe. The savages are not ignorant of the art of hunting and taking them; they follow them by the track of their feet, very often for many days together; and, by constancy and dexterity, they often gain their end. Their method of hunting them in winter is particularly singular:—"They make use of rackets, or "snow-shoes," says Denys, "by means of which, they walk "upon the snow without sinking in. The *original* does "not cover a deal of ground, because of his sinking in the "snow, which greatly fatigues him; he eats nothing but "the young shoots of the trees during the whole year; "therefore, where the savages find the trees eaten, they "presently meet with the beasts, which are not far off, and "which they approach very easily. They throw a dart at "them, which is a large club, at the end of which is "fastened a large pointed bone, which pierces like a sword. "If there are many originals in one troop, they drive them "away; for then, the originals, placing themselves in "a rank, describe a large circle of a mile and a half, or "two miles, and sometimes more. They harden the snow "so much with their feet in turning round, that they

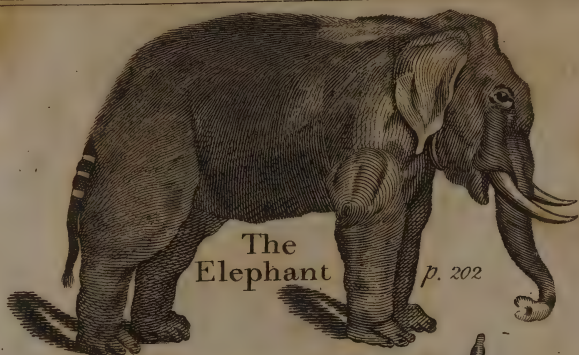
“ no longer sink in. The savages in America wait for
 “ their passing them, and then throw their darts, and
 “ kill them.”

C H A P. XVIII.

Of the Ibex—The Chamois, and other Goats—The Saiga—The Antelope, or Gazelle—Of the Bezoar Stone—Of the Bubalus, or Stag-like Antelope—The Condoma, or striped Antelope—The Guib, or harnessed Antelope—The Grimm—The Chevrotins—The Mazame, and Temamacame—The Coudous, or Indian Antelope—The Musk—The Production of that Perfume.

THE IBEX, THE CHAMOIS, **A**LTHOUGH it appears, AND OTHER GOATS. that the Greeks were acquainted with the ibex and the chamois, yet they have not described them by any particular denominations, nor even by characters sufficiently exact for them to be distinguished by: they have only indicated them under the generical name of *wild goats*. They probably presumed, that these animals were of the same species as the domestic goats, as they have not given them proper names, as they have done to every other different species of animals: on the contrary, all our modern naturalists have regarded the ibex and the chamois as two real and distinct species, and both of them different from that of our goats.

The male ibex differs from the chamois, by the length, thickness and form of the horns; it is also much more bulky, vigorous and strong. The female ibex has horns different from the male; they are also much smaller, and nearly resembling those of the chamois. In other respects, these two animals have the same customs, the same manners, and the same country; only the ibex, as he is endowed with more agility, and is stronger than the chamois, climbs to the summit of the highest mountains; while the chamois only lives in the second stage; but neither the one nor the other is to be found in the plains: both make their way on the snow; both ascend precipices by bounding from rock to rock; both are covered with a firm and solid skin, and clothed, in winter, with a double fur, with very rough hair outwardly, and a finer and thicker hair underneath; both of them have a black stripe on the back, and both likewise have the tail nearly of the same size. The number of exterior
 resem-



The
Elephant

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The Rhinoceros

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The JudaGoat

p. 246



Ditto p. 246





The Zebu

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The Male Goat

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The
Female Goat

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The Elk

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resemblances is so great, in comparison with the differences, and the conformity of the exterior parts is so complete, that, if we reason in consequence of these accounts, we might be led to believe, that these two animals are not really of a different species, but that they are simply only constant varieties of one and the same species. The ibex, as well as the chamois, when taken young and brought up with domestic goats, are easily tamed; and, accustomed to domesticity, imbibe the same manners, herd together, return to the stable, and probably copulate together. I avow, however, that this fact, the most important of all, and which alone would decide the question, is not known to us.

Let us, nevertheless, take a view of the opposite reasons. The species of the ibex and the chamois both subsist in a state of nature, and both are constantly distinct. The chamois sometimes comes, of his own accord, and joins the flock of our domestic sheep. The ibex never joins them, at least not before it is tamed. The ibex and the he-goat have a very long beard, and the chamois has none at all; the male and female chamois have very small horns; those of the male ibex are so thick and so long, that they would scarcely be imagined to belong to an animal of its size. The horns of the male ibex are not very different from those of the goat; as the female, however, approaches our goat, and even the chamois, in the size and smallness of the horns, may we not conclude, that these animals, the chamois, and the domestic goat, are, in fact, but one and the same species, in which the nature of the females is inviolable and alike, while the males are subject to varieties, which render them different one from the other?

The ibex, or wild goat, entirely and exactly resembles the domestic goat, by the conformation, the organization, and the natural and physical habits; it only varies by two slight differences; the one externally, and the other internally. The horns of the ibex are longer than those of the he-goat; they have two longitudinal ridges; those of the goat have but one; they have also thick knots, or transverse tubercles, which mark the number of years of their growth, while those of the goats are only marked with transverse strokes. The ibex runs as fast as the stag, and leaps lighter than the roe-buck. All goats are liable to vertigos, which are common to them with the ibex and the chamois, as well as the inclination to climb up rocks; and still another custom, which is that of continually licking the stones,

especially those which are strongly impregnated with salt-petre, or common salt. In the Alps there are rocks which have been hollowed by the tongue of the chamois. These are commonly soft and calcinable stones, in which, as is well known, there is always a certain quantity of nitre. These natural agreements, these conformable customs, among other circumstances, appear to me to be sufficient indexes of the identity of species in these animals.

The ibex and the chamois, one of which I look upon as the male, and the other as the female stock of the goat species, are only found, like the mufſion, who is the source of the sheep species, in deserts, and upon the most craggy places of the highest mountains: the Alps, the Pyrenees, the mountains of Greece, and those of the islands of the Archipelago, are almost the only places where the ibex and the chamois are to be found. But, although both these animals dislike heat, and only inhabit the region of snow and ice, yet they have also an aversion to excessive cold. In the summer, they chuse the north of the mountains; in winter, they descend into the valleys; neither the one nor the other can support themselves on their legs upon the ice, when it is smooth; but, if there be the least inequalities on its surface, they bound along with security.

The chase of these animals is very troublesome, and dogs are entirely useless in it; it is likewise very dangerous to men; for sometimes the animal, finding itself hard pushed, turns and strikes the hunter, and precipitates him from the rock. The chamois is as swift, but not so strong as the ibex; the species of this last is more numerous; and they commonly go in herds; there are, however, less at this present time than there were formerly, at least in the Alps and Pyrenean mountains.

Mr. Perond, surveyor of the crystal mines in the Alps, having brought over a living chamois, has given us the following information on the natural habits of this animal:—
 “ The chamois is a wild animal, but easily tamed, and very docile. It is about the size of a domestic goat, and resembles one in many respects. It is most agreeably lively, and active beyond expression. Its hair is short, like that of the doe; in spring it is of an ash-colour, and in winter of a blackish brown. The large males keep themselves apart from the rest, except in their rutting time. The time of their coupling is from the beginning of October to the end of November; and they bring forth in April and March. The young follows the dam for about five months, and sometimes longer,

longer, if the hunters, or the wolves, do not separate them. It is asserted, that they live between twenty and thirty years. The flesh of the chamois is good to eat; and some of the fattest afford ten or twelve pounds of suet, which far surpasses that of the goat in solidity and goodness.

The cry of the chamois is not distinctly known: if it has any, it is but faint, and resembling that of a hoarse goat; it is by this cry it calls its young; but, when they are frightened, or are in danger of any enemy, or some other object not perfectly known to them, they warn the rest of the flock by a kind of hissing noise. It is observable, that the chamois has a very penetrating eye, and its hearing and smell are not less distinguishing. When it finds an enemy near, it stops for a moment, and then in an instant flies off with the utmost speed. When the wind is in its favour, it can smell a human creature for more than half a mile distance. When this happens, therefore, and it cannot see its enemy, but only discovers his approach by the scent, he begins the hissing noise with such force, that the rocks and the forests re-echo with the sound. This hissing continues as long as the breath will permit. In the beginning it is very shrill, and deeper towards the close. The animal then rests a moment, after this alarm, to inspect farther into its danger; and, having confirmed the reality of its suspicion, it recommences to hiss by intervals, till it has spread the alarm to a great distance. During this time, it is in the most violent agitation, strikes the ground forcibly with its fore foot, and sometimes with both; it bounds from rock to rock; it turns, and looks round; it runs to the edge of the precipice, and when it has obtained a sight of the enemy, flies from it with all its speed. The hissing of the male is much more acute than that of the female: it is performed through the nostrils, and is, properly, no more than a very strong breath, forced through the nostrils by fixing the tongue to the palate, keeping the teeth nearly shut, the lips open, and a little lengthened. The chamois feeds upon the best herbage, and chuses the most delicate parts of plants, flowers, and the most tender buds. It is not less delicate with regard to several aromatic herbs, which grow upon the sides of the Alps. It drinks but very little, while it feeds upon the succulent herbage, and ruminates, like the goat, in the intervals of feeding. Its head is crowned with two small horns, of about half a foot long, of a beautiful black, and rising from the forehead, almost betwixt the eyes. These horns are often made use of for the heads of canes. The hides

hides of these animals are very strong and supple, and good warm waistcoats and gloves are made of them.

The hunting of the chamois is very laborious, and extremely difficult. The most usual way of taking them, is, by hiding behind some of the clefts of the rocks, and shooting them. The sportsman is obliged to take great precaution in this business, and to creep, for a vast way, upon his belly, observing, at the same time, to keep the wind in his face. When he is got within a proper distance, and properly secured from sight, he only advances his head and arms, with the piece, from his hiding place, and fires among them: others hunt this animal, as they do the stag, by placing proper persons at all the passages of the glade or valley, and then sending in others to rouse the game.

THE SAIGA.] There is a sort of wild goat found in Hungary, in Tartary, and in South Siberia, which the Russians called *Seigak*, or *Saiga*. It bears a resemblance to the domestic goat, in the shape of its body, and in its hair; but, by the shape of the horns, and the defect of the beard, it approaches nearer the *gazelle*, and appears to be a mixture of these two animals.

The saiga, by its natural habits, resembles more the gazel than the ibex and the chamois; for it does not delight in mountainous countries, but lives upon the hills and on the plains. It is very agile, very swift, and its flesh is much better eating than that of the ibex, or any other wild or tame goat.

THE ANTELOPE, OR GAZELLE.] There have been thirteen species, or, at least, thirteen very distinct varieties, noted of these animals. In this uncertainty, in knowing whether they are only varieties, or in fact really different species, we have thought proper to put them all together, assigning to each of them a particular name. The first is the common *gazelle*, found in Syria, in Mesopotamia, and in all the other provinces of the Levant, as well as in Barbary, and in all the northern parts of Africa. The horns of this animal are about a foot long, entirely annulated at the base, which lessen into half rings towards the extremity; they are not only surrounded with these rings, but also longitudinally furrowed by small streaks. These rings mark the number of years of their growth, which is commonly about twelve or thirteen. The gazelles in general, and this tribe in particular, greatly resemble the roe-buck, in the proportions of the body, its natural functions, its swiftness, and the brightness

brightness and beauty of its eyes. These resemblances would tempt us to think, that, as the roe-buck does not exist where the gazelle does, the latter was only a degeneration of the first; or, that the roe-buck is only a gazelle, whose nature is altered by the influence of the climate, and by the effect of the different food, did not the gazelle differ from the roe-buck in the nature and fashion of its horns; those of the roe-buck, which may be said to be solid, fall off, and are renewed every year, like those of the stag: on the contrary, the horns of the gazelle are hollow and permanent, like those of the goat; the roe-buck has also no gall-bladder, which is to be found in the gazelle, as well as in the goat: on the other hand, the gazelles have, in common with the roe-buck, deep pits under the eyes, and resemble it still more in the colour and quality of the hair, in the bunches upon their legs, which only differ in being upon the fore legs of the gazelle, and upon the hinder legs of the roe-buck. The gazelles, therefore, seem to be of a middle nature between the two animals; but, when we consider, that the roe-buck is an animal which is to be found in both continents, and that the goats, on the contrary, as well as the gazelles, do not exist in the New World, we shall easily perceive, that these two species, the goat and the gazelle, are more nearly related to each other than they are to the roe-buck.

The second gazelle is an animal found in Senegal, and is called the *kevel*. It is something less than the former, and nearly of the size of a small roe-buck; it differs also in its eyes, which are much larger; and its horns, instead of being round, are flattened on the sides, as well in the male as in the female; in other respects, the kevel entirely resembles the gazelle.

The third animal is called the *corin*, the name it bears in Senegal. It greatly resembles the gazelle and the kevel, but is still less than either; its horns also are much smaller, and smoother than those of the other two; and the annular prominences belonging to this kind are scarcely discernible.

In the Royal Cabinet of France, there are skins of these three different gazelles; besides which, is a horn which bears a great resemblance to those of the gazelle and kevel, and only differs from them in being much thicker. Its thickness and length seem to indicate a much larger animal than the common gazelle; and it appears to us to belong to a gazelle which the Turks call *txeran*, and the Persians *atur*. This
animal,

animal, according to Olearius, in some measure, resembles our deer, except that it is rather of a red colour than brown; the horns, likewise, are without antlers, and rest upon the back, &c. Mr. Gmelin, who describes it under the name of *doheren*, says, it resembles the roe-buck, with this exception, that the horns are like those of the ibex, hollow, and, like them, never fall off.

To the four first species or tribes of gazelles, must be added two other animals, which resemble them in many things. The first is called *koba* at Senegal, where the French have stiled it the *great brown cow*. The second, which we call the *kob*, is also an animal of Senegal, which the French have denominated the *small brown cow*. The horns of the kob greatly resemble those of the gazelle and the kevel; but the shape of the head is different; the muzzle is much longer, and there are no pits nor depressions under the eyes.

The seventh animal of this species, or of this genus, is a gazelle which is found in the Levant, but more commonly in Egypt, and in Arabia. It is called, from its Arabian name *algazelle*; it is shaped pretty much like the other gazelles, and is nearly of the size of a deer; but its horns are long, small, and but little rounded till towards the extremity, when they turn short with a sharp flexure; they are black, and almost smooth, and the annular prominences scarcely observable, except towards the base, where they are a little more visible. They are about three feet in length, while those of the gazelle are commonly but one foot, those of the kevel fourteen and fifteen inches, and those of the corin (which, nevertheless, resembles this the most), only six or seven inches.

The eighth animal is that which is vulgarly called the *Bezoar gazelle*, but by the eastern nations *pasan*, which name we retain. This gazelle is of the size of our domestic he-goat; and it has the hair, shape, and agility of the stag. In most respects, these two species, the *algazelle* and the *pasan*, appear to us to have a great affinity. They are also natives of the same climate, and found in the Levant, in Egypt, in Barbary, in Arabia, and Persia; but there is this difference: the *algazelle* feeds upon the plains, and the *pasan* is only found in the mountains. The flesh of both is very good food.

The ninth gazelle is an animal which is called *nanguer* at Senegal. It is three feet and an half long, two feet and an half high; it is of the colour of the roe-buck, fallow upon the upper parts of the body, white under the belly and
upon

upon the hinder parts, with a spot of the same colour on the neck. Its horns are prominent, like those of the other gazelles, and are about six or seven inches in length: they are black, and round; but, what is very particular in them, is, that near the points they are crooked forwards, nearly as those of the chamois are bent backwards. These nanguers are very beautiful animals, and very easy to tame.

The tenth gazelle is a very common animal in Barbary, and in Mauritania, and so well known to the English, that they have given it the name of the *antelope*. This animal is of the size of a roe-buck, and greatly resembles the common gazelle and the kevel, yet differs from them in many particulars, so as to be looked upon as an animal of a different species. This antelope has deeper eye-pits than the common gazelle; its horns are about fourteen inches long, almost touching each other at the bottom, spreading as they rise, so as, at their tips, to be sixteen inches asunder. They have the annular prominences of the gazelle and the kevel, but not so distinguishable as in those. But what serves particularly to distinguish this antelope, is, the double flexure, very uniform and remarkable, so that the two horns make a tolerable representation of an antique lyre.

In reviewing all the animals of this class, we find there are about twelve species, or distinct varieties, in the gazelles; and, after having carefully compared them, we suppose, first, that the common gazelle, the kevel, and the corin, are only three varieties of one species; secondly, that the tzeiran, the koba, and the kob, are all three varieties of another species; thirdly, we presume, that the algazelle, and the pafan, are only two varieties of the same species; and we imagine, that the name *Bezoar gazelle*, which has been given to the pafan, is no distinctive character; for we think ourselves able to prove, that the Oriental bezoar does not come from the pafan alone, but from all the gazelles and goats which live in the mountains of Asia; fourthly, it appears, that the nanguers, whose horns are crooked forwards, and who, together, compose two or three particular varieties, have been indicated by the ancients under the name of the *dama*; and, fifthly, that the antelopes, which are about three or four in number, and which differ from all others by the double flexure of their horns, have also been known to the ancients by the names of *strepicheros*, and of *addax*.

The gazelles are hunted not only with dogs, assisted by the falcon, but also, in some countries, with the ounce. This

This fine animal, tamed for the purpose, generally goes with the hunter; and, when the prey is near, they unchain it, and shew it the gazelles. It immediately exerts all its arts and fierceness in the pursuit; not, as might be supposed, by running after them, but by turning and winding about with the utmost cunning, till it is near its prey, when it bounds all at once upon the gazelle, strangles it instantaneously, and sucks its blood. If it misses its aim, which often happens, it rests in the place, nor attempts to pursue them any further; perhaps from the instinct, that, as they can run much swifter, and a longer time, the chase would be useless. The master then draws near the ounce, coaxing it, and flinging it some pieces of flesh, until he is near enough to chain, and bring it back to its former station.

In some places, they take the wild gazelles by means of a tame one, to the horns of which they fasten a snare made of cord. When a herd of gazelles is found, the tame one is sent among the rest; it no sooner approaches, than the males of the wild herd advance to oppose him, and, in butting with their horns, are entangled in the noose. In this struggle, they both commonly fall to the ground, when the hunter coming up, kills the one, and disengages the other.

The antelopes, especially the largest sort, are much more common in Africa than in India; they are stronger and fiercer than the other gazelles, from which they are easily distinguishable by the double flexure of their horns; they have also no black or brown streaks on their sides. The middling-sized antelope is about the size and colour of the deer; their horns are very black, their body very white, and their fore legs shorter than the hinder ones. They are well made, and only sleep in dry and clean places; they are likewise very swift, very watchful, and very apprehensive of danger; so that, in open places, when they see a man, a dog, or any other enemy, they fly, with all their swiftness, till they are out of danger. But, notwithstanding this natural timidity, they have a kind of courage, if they are surprised, when they turn short round, and face the enemy that attacks them, with great firmness.

The bezoar stone is the production not only of gazelles, but of wild and domestic goats, and even sheep. Probably the formation of this stone depends more on the temperature of the climate, and the quality of the food, than on the nature or species of the animal. Some authors have asserted, that the true occidental bezoar, i. e. that which
possesses

possesses most virtue, is the production of monkeys, and not of gazelles, goats, or sheep. But this opinion is not founded on a proper basis; for we have seen many of these concretions, to which the name of *monkey bezoar* has been given, quite different from the *Oriental bezoar*, which is certainly produced by a ruminating animal, and which is easily distinguishable from all other bezoars, by its shape, substance, and colour, which is generally of an olive brown without and within; while the *occidental* bezoar is of a pale yellow; the substance of the first is also softer and finer; that of the last, harder and drier. The Oriental bezoar has been prodigiously in vogue, and a great consumption has been made of it in the last century; and, since it has been made use of in Europe and in Asia, for all cases in which our present physicians give cordial medicines, and other antidotes, may we not presume, by the great quantities which formerly have been, and by what at present is consumed, that this stone is produced not from a single species of animal, but from many; and that it is equally the production of gazelles, goats, and sheep, who cannot produce it but in certain climates of the Levant and Indies.

This stone is formed, as is well known, by concentrical layers, and often contains some foreign matter, even from the circumference to the very center. We have enquired into the nature of this matter, which serves as a nucleus to the Oriental bezoar, from which a judgment may be formed of the kind of animal that has swallowed them. This nucleus is of various kinds, sometimes pieces of flint, tamarinds, grains of Cassia, pieces of straw, and the young buds of trees in particular; therefore, from the above facts, we can attribute this production only to those animals which brouze upon shrubs and leaves.

Garcias ab Horte says, that in Corraſon, and in Persia, there is a kind of goats called pasans, and that it is in their stomachs that the bezoar is formed; for, in the great number of goats that are killed for the subsistence of the troops, the stones are eagerly sought after, in the stomachs of these animals, and very commonly found there.

With respect to the occidental bezoars, we can affirm, that they proceed neither from goats nor gazelles, nor even any animal of that kind, in all the extent of the New World. Instead of gazelles, we only meet with roe-bucks in the woods of America; instead of wild goats and sheep, animals of a quite different nature are seen on the mountains of Peru and Chili, viz. the lamas, and the pacos.

Mr.

Mr. Daubenton, who has more narrowly inspected into the nature of bezoar stones than any other person, thinks that they are composed of a matter similar to that which fastens itself to the teeth of ruminating animals, in form of a shining tartareous matter.

The chamois, and perhaps the ibex of the Alps, the goats of Guinea, and many other animals of America, afford bezoar; and, if we comprehend under this name, all concretions of this nature which is met with in different animals, we may be assured, that most quadrupeds, excepting carnivorous ones, produce bezoar, which is even to be found in crocodiles and alligators.

To form, therefore, a clear idea of these concretions, it will be necessary to divide them into many classes, and fix them to the animals which produced them, observing, at the same time, the climate, and the food, which mostly assisted this kind of production.

First, then, the stones which are found in the bladder, and in the reins of men, and other animals, must be held distinct from the bezoar class, and described by the name of *calculi*, their substance being quite different from that of the bezoar; they are easily known by their weight, their urinous smell, and their composition, which is not regular, nor formed with concentric layers, like that of the bezoar.

2. The concretions that are often found in the gall-bladder, and in the liver of the human species, and of the brute creation, must not be regarded as bezoar stones, they being easily distinguishable from them, by their lightness, their colour, and their inflammability; and, besides, they are not formed by layers encircled round, or nucleuses, like the bezoar.

3. The balls that are often found in the stomach of animals, and especially in those that ruminate, are not true bezoars. These balls, which are called *egagropiles*, are composed internally of the hair the animal has licked off, and swallowed, or from the hard roots which he has fed upon, and which he could not digest; their external part is encrusted with a viscous substance, something similar to that of the bezoar. The *egagropiles*, therefore, have nothing in them, except this external layer, of the bezoar; and a single inspection is sufficient to distinguish the one from the other.

4. *Egagropiles* are often found in the animals of temperate climates, but scarcely ever any bezoar. Animals of hotter countries, on the contrary, only produce bezoar: the elephant,

elephant, the rhinoceros, the goats, the gazelles of Asia and Africa, the lama of Peru, and others, produce, instead of *egagropiles*, solid bezoar, whose substance and size varies relatively, according to the difference of the animals and the climates.

5. The bezoar to which the greatest virtues and properties has been attributed, is the Oriental bezoar, which, as we have said, proceeds from goats, gazelles, and sheep, which feed on the mountains of Asia. The bezoar of an inferior quality, and which is called *occidental*, is produced from lamas and pacos, which are to be found in the mountains of South America. In short, the goats and gazelles of Africa also produce bezoar, but not of so good a quality as those of Asia.

From all these circumstances, we may conclude, that, in general, the bezoar is only a residue of the vegetable nutriment, which is not to be found in carnivorous animals, and which is only produced in those who feed on plants; that in the mountains of Southern Asia, the herbage being stronger than in any other part of the world, the bezoar which is made from the residue of that food, has also more virtues than any other; that in America, where the heat is less, the grass of the mountains being weaker, the bezoars produced there, are inferior to the first; and in Europe, where the grass is still weaker, and in all the valleys of both continents, no bezoar is produced, but only *egagropiles*, which contain nothing but hair or roots, and very hard filaments, which the animal was unable to digest.

THE BUBALUS, OR STAG-LIKE ANTELOPE.] The name of bubalus has been very improperly applied to the buffalo, of which we have already taken notice in our description of that animal. It belonged formerly only to the animal in question, which is of a very distant nature from the buffalo. It resembles the stag, the gazelle, and the ox, in many very remarkable respects; the stag, in the size and shape of its body and legs, in particular; but its horns are permanent, and made nearly like those of the largest gazelles; which animal it also resembles in its natural habits: its head, however, is much longer than the gazelle's, and even than the stag's; and it resembles the ox, by the length of the muzzle, and the disposition of the bones of the head.

The horns of the bubalus are crooked backwards, and twisted like a corkscrew. The shoulders are elevated, so that they form a sort of bunch upon the withers. The tail

is almost a foot long, and furnished with a quantity of hair at its extremity.

The hair of the bubalus is like that of the elk, fine towards the root, thick in the middle and extremity. This character is particular to these two animals; for the hair of almost every quadruped is thicker at the root than at the middle and point. The hair is nearly of the same colour as the elk, though much shorter, thinner, and softer; and these alone are the resemblances between the bubalus and the elk.

The bubalus is common in Barbary, and in all the northern parts of Africa. It is nearly of the same nature as the antelope, and has, like that, short hair, and a black hide, and flesh which makes very good food.

THE CONDOMA, OR STRIPED ANTELOPE.] The Marquis de Marigny shewed me, in his cabinet, the head of an animal, which, at first sight, I supposed to have belonged to a great bubalus. It is like those of our largest stags; but the horns, instead of being solid like those of the stag, are large and hollow, with a ridge like those of the goat kind, and with varied flexures like those of the antelope. In examining the royal cabinet for what might be there relative to this animal, we found two horns which belonged to it; the first, without any mark or name, came from his Majesty's wardrobe; the second was given to me, in 1760, by M. Bauchis, Commissary of the Marines, with the name of the Condoma of the Cape of Good Hope affixed to it. The last name we have thought proper to adopt, as the animal which it denotes has never before been described nor denominated.

In looking over the works of travellers, for those marks which might have an affinity with the remarkable size of the horns of this animal, we can find none which have a nearer relation to it than those of the animal indicated by Kolbe, by the name of the *wild goat* of the Cape of Good Hope.—“This goat,” he says, “to which the Hottentots have not as yet given a name, and which I call the *wild goat*, is very remarkable in many respects. It is about the size of a large stag; its head is very handsome, ornamented with two crooked and pointed horns, about three feet long, and, at their extremities, about two feet asunder. All along the back there runs a white list, which ends at the insertion of the tail; another, of the same colour, crosses this, at the bottom of the neck, which it entirely surrounds.”

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The Guib

p. 259



The Chevrotin p. 259



“surrounds. There are two more running round the body,
 “one behind the fore legs, and one parallel to it, before the
 “other. The colour of the rest of the body is greyish,
 “except the belly, which is white. It has also a long,
 “grey beard; and its legs, though long, are well pro-
 “portioned.”

The GUIB, or HARNESSSED ANTELOPE, is an animal which has not been indicated by any naturalist, nor even by any traveller, notwithstanding it is common enough in Senegal. It resembles the gazelles, especially the nanguer, by the size and shape of its body, by the fineness of its legs, by the shape of its head and muzzle, by the eyes, by the ears and length of its tail, and by the defect of a beard; but every gazelle, especially the nanguer, has the colour of the belly white, while the breast and belly of the guib is of a deep brown. It also differs from the gazelles by the horns, which are smooth, and not marked with annular prominences. They are also a little compressed; and the guib, in these particulars, is more like the goat than the gazelle; nevertheless, it is neither the one nor the other, but of a particular kind, which seems to us to be intermediate between the gazelle and the goat. It is also remarkable for white lists on a brown ground, which are disposed along the animal's body, as if it were covered with a harness. It feeds in company; and they are found in numerous herds in the plains of Padot.

THE GRIMM.] This animal is only known to naturalists by the name of the *wild goat of Grimmus*; and, as we are not acquainted with the name it bears in its own country, we cannot do better than adopt this precarious denomination. There are two characters which are sufficient to distinguish it. The first is a very deep cavity under each eye; the second is a tuft of hair, standing upright on the top of the head. It resembles both the goat and the gazelle, not only in the shape of its body, but even in its horns, which are annulated towards the base, and have longitudinal streaks, like those of the gazelles; at the same time, they are very short, and bend backwards in an horizontal direction. There is some reason to think, that the male grimm alone is furnished with horns.

THE CHEVROTINS.] We have given the name of *chevrotin* (*tragulus*) to those small animals of the hotter
 S 2 countries

countries of Africa and Asia, which almost every traveller has mentioned, by the denomination of *small stags*, or *little hinds*: in fact, the chevrotin is a miniature resemblance of the stag, by the shape of its muzzle, the delicacy of its body, the shortness of its tail, and the shape of its legs; but it differs greatly from it in the size, the largest chevrotins being never found longer than the hare. In other respects, the horns of those which have any, are hollow, annulated, and nearly resembling the gazelles. Their foot is cloven, and is also more of the gazelle than of the stag kind. They differ both from the gazelle and the stag, by not having any depressions or hollows under their eyes, and in that respect approach nearer the goat kind; but, in reality, they are neither stag, gazelle, nor goat, and constitute one or more distinct species. Seba gives the figures and the descriptions of five chevrotins: the first, the *small red Guinea hind, without horns*; the second, the *fawn, or small African stag*; the third, the *small young stag of Guinea*; the fourth, the *small red and white spotted hind of Surinam*; the fifth, the *red-baired African stag*. Of these five chevrotins mentioned by Seba, the first, second, and third, are evidently the same animal; the fifth, which is larger than the three first, and whose hair is redder, much longer, and of a deeper brown, seems to us to be only a variety of this species; the fourth, which the author indicates as an animal of Surinam, is, according to our opinion, only a second variety of this species, which is only found in Africa, and in the southern parts of Asia.

These animals are of an elegant make, and finely proportioned for their size. But, though they leap and bound with prodigious swiftness, yet, apparently, they cannot continue it for a long time; for the Indians often hunt them down; and the Negroes likewise pursue them, and knock them down with their sticks. They are greatly hunted after, as their flesh is excellent food. They can only live in excessively hot climates; and they are so exceedingly delicate, that it is with the greatest trouble they are transported into Europe alive, where they perish in a short time. They are easily tamed, very familiar, and beautiful. The chevrotin is, without doubt, the least of all cloven-footed animals. According to this character, they should not bring forth many young; but, if we reason from their small size, we should imagine they brought forth several at a time. They are exceedingly numerous in the Indies, Java, Ceylon, Senegal, Congo, and in every other country that is ex-

cessively hot, and are not to be found in America, nor in any of the temperate climates of the Old Continent.

MAZAME, in the Mexican language, was the name of the stag, or rather of the whole race of stags, deer, and roe-bucks. Travellers distinguish two kinds of mazames, both common to Mexico and New Spain; the first and largest, to which they give the simple name of mazame, has a horn like that of the roe-buck of Europe, about six or seven inches in length, with the extremity divided into two points; the second, called *temamacame*, is less than the former, and has but a single horn, and without any antlers. These two animals seem to be roe-bucks; the first of which is absolutely of the same species as the European roe-buck, and the second no more than a variety of it.

THE COUDOUS, OR INDIAN ANTELOPE.] Of all animals, those that chew the cud are the most numerous, and most varied. In the very great quantity of horns collected together in the Royal Cabinet, or dispersed in private collections, there still remains one without label, without name, absolutely unknown, and of which we have no other indexes than those which we can draw from the subject itself. This horn is large, almost straight, and very thick and black. It is not solid like that of the stag, but resembles that of the ox. After seeking in a number of different cabinets, we at last found, in that of Mr. Dupleix, a head adorned with two horns, resembling this we mention: this was labelled with these words—*The horns of an animal nearly like a horse, of a greyish colour, with a mane before its head: it is called, at Pondicherry, COESDOES, which should be pronounced COUDOUS.*

The coudous may possibly be of the buffalo species; and the travellers in Africa, where the buffalo is as common as in Asia, more precisely mention a kind of buffalo, called *pacasse* at Congo, which, by the indexes, seems to us to be the coudous. “In the route from Louanda to the kingdom of Congo, we perceived,” say they, “two pacasses, which are animals greatly resembling buffaloes, and which roar like lions. The male and female go always together. They are white, spotted with red and black. Their ears are about half an ell long; and their horns are short. They neither fly at the sight of the human species, nor do they do them any injury, but only look at them as they pass by.”

THE MUSK ANIMAL.] To finish a complete history of goats, and other animals of this genus, there is only one remaining to be described, which is as famous as it is unknown. The animal we mean, is that which produces the musk, which all modern naturalists, and the greatest part of travellers through Asia, have spoken of, some by the name the stag, roe-buck, and musk-goat; others have considered it as a large chevrotin; and truly it seems to be of an ambiguous nature, participating of all the above animals, although, at the same time, we can assert, that its species is different from all others. It is about the size of a small roe-buck, or gazelle; but its head is without horns; and by this character it resembles the *memina*, or chevrotin of India. It has two great canine teeth or tusks in the upper jaw, by which it approaches the chevrotin; but, what distinguishes it from all other animals, is a kind of bag, about two or three inches in diameter, which grows near the navel, and in which a liquor filtrates, which differs from the civet by its smell and consistence. Neither the Greeks nor Romans have made any mention of the musk-animal; and Grew is the only person who has made an exact description of it from its skin. The description given by that author is as follows;

The musk stag is about three feet six inches in length, from the head to the tail; and the head is about half a foot long; the neck, seven or eight inches; the fore part of the head, three inches broad, and like that of a greyhound; the ears are erect, like those of a rabbit, and about three inches long; the tail is not above two inches; the fore legs are about thirteen or fourteen inches high; it is cloven-footed, armed behind and before with two horny substances, but none on the hind feet.

The bladder or bag which contains the musk is about three inches long, two broad, and stands out from the belly about an inch and an half. The animal has twenty-six teeth. There is also a tusk, or canine tooth, about two inches and an half long, on each side in the upper jaw, which terminate in the form of a hook. It has no horns. It appears, farther, that the hair of this animal is long and rough, the muzzle pointed, and tusks somewhat like those of the hog. By these marks it approaches the boar kind, and perhaps still more that of the *babiroussa*, which the naturalists have denominated the *Indian boar*. The American hog also, which we call *pecari*, has a bag or cavity on its back, containing plenty of a very odoriferous humour. In general,

general, those animals which produce odoriferous liquors, as the badger, the castor, the pecari, the oudatra, the derman, the civet, the zibet, are not of the stag or goat kind, Thus we might be tempted to think, that the musk animal is nearer the hog species than that of the goat.

In respect to the matter of musk itself, its essence, that is, its pure substance, is perhaps as little known as the nature of the animal which produces it. All travellers agree, that the musk is always mixed and adulterated with blood, or some other drugs, by those who sell it. The Chinese not only increase the quantity by this mixture, but they endeavour likewise to increase the weight, by incorporating with it lead very finely ground. The purest musk, and that which is the most sought after, even by the Chinese themselves, is that which the animal deposits upon trees or stones, against which it rubs itself when the quantity renders it uneasy. The musk which is brought over in the bag, is very seldom so good, because it is not yet ripe, or because it is only in their rutting season that it acquires all its strength and all its smell; and it is at this time the animal endeavours to disburthen itself of this pure matter, which then causes such violent itchings and irritations. A single grain of musk is sufficient to perfume a great quantity of other matter; and the odour expands itself to a very great distance. The smallest particle is sufficient to perfume a considerable space; and the perfume itself is so permanent, that, at the end of several years, it does not seem to have lost much of its power.

C H A P. XIX.

Of the Babiroussa, or Indian Hog—The Cabiai—The Porcupine—The Couando—The Urson—The Asiatic Hedge-hogs—The Camelopard—The Lama, and Paco.—The Sloth—The Surikat—The Tarsier—The Phalanger—The Coquallin—The Hamster—The Bobak—The Ferboa—The Ichneumon—The Fossan—The Vansire—The Maki, or Maucacau—The The Lori—The Javelin Bat.

THE BABIROUSSA, OR **A**LL naturalists have regarded
INDIAN HOG.] this animal as a kind of hog, though it has neither the head, shape, bristles, nor tail of a hog. Its legs are longer, and its muzzle shorter. It is covered with soft and short hair like wool; and its tail is terminated by a tuft of the same; its body is likewise not so

thick and clumsy as that of the hog ; its hair is grey, mixed with red and a little black ; its ears are short and pointed ; but the most remarkable character, and what distinguishes it from all other animals, are four enormous tusks, or canine teeth, the two shortest of which shoot out of the lower jaw, like those of the boar ; the two others, which come from the upper jaw, pierce the cheeks, or rather the upper part of the lips, and rise crooked almost to the eyes. These tusks are of a very beautiful ivory, much smoother and finer, but not so hard as that of the elephant.

These quadruple and enormous tusks, give these animals a very formidable appearance ; they are, however, less dangerous than our wild boars. They go, like them, in herds ; they have a very strong smell, by which they are easily discovered, and hunted with good success. They grunt terribly, defend themselves, and wound their enemy with their under tusks ; for the upper are rather of disservice than of use to them. Although wild and ferocious as the boar, they are tamed with great ease ; and their flesh, which is very good food, putrefies in a very short time. As their hair is fine, and their skin delicate, it is soon penetrated by the teeth of the dogs, who hunt them in preference to wild boars, and sooner accomplish their purpose. The babiroussa strikes its upper tusks into the branches of trees, to rest its head, or to sleep standing. This habit it has in common with the elephant, who, in order to sleep in an erect posture, supports his head by fixing the end of his tusks in the holes which he makes in his lodging.

The babiroussa differs still more from the wild boar by its natural appetites. It feeds upon grass and leaves of trees, and does not endeavour to enter gardens, to feed on beans, pease, and other vegetables ; while the wild boar, who lives in the same country, feeds upon wild fruits, roots, and often on the depredations it makes in gardens. These animals, who go alike in herds, never mix ; the wild boars keep on one side, and the babiroussas on the other ; these walk quicker, and have a very fine smell. They often fix themselves against a tree, to keep off the hunters and their dogs. When they are pursued for a long time, they make towards the sea, and, swimming with great dexterity, very often escape their pursuit ; for they swim for a very long time, and often to very great distances, and from one island to another.

The babiroussa is found not only in the island of Bourou, or Boero, near Amboyna, but also in many parts of Southern

Asia and Africa; as at Estrila, Senegal, Madagascar, &c. We have not had it in our power to convince ourselves, that the female had not the two tusks which are so remarkable in the male; but most authors, who have spoken of this animal, seem to agree in this circumstance.

THE CABIAI.] This American animal has never yet made its appearance in England. It is not a hog, as naturalists and travellers pretend; it even resembles it only by trifling marks, and differs from it by striking characters. The largest cabiai is scarcely the size of a hog of eighteen months growth. The head is longer; the eyes are larger; the snout, instead of being rounded, as in the hog, is split like that of a rabbit or hare, and furnished with thick, strong whiskers; the mouth is not so wide; the number and form of the teeth are different; for it is without tusks: like the peccary, it wants a tail, and, unlike to all others of this kind, is in a manner web-footed, and thus easily fitted for swimming and living in water. The hoofs before are divided into four parts, and those behind into three; between the divisions, there is a prolongation of the skin; so that the feet, when opened in swimming, can beat a greater surface of water.

This animal, thus made for the water, swims there like a badger, seeks the same prey, and seizes the fish with its feet and teeth, and carries them to the edge of the lake, to devour them with the greater ease. It lives also upon fruits, corn, and sugar-canes. As its legs are broad and flat, it often sits upright upon its hind-legs. Its cry resembles more the braying of an ass than the grunting of an hog. It seldom stirs out but at night, and almost always in company, without going far from the sides of the water in which it preys. It can find no safety by flight; and, in order to escape its enemies which pursue it, it plunges into the water, remains at the bottom a long time, and rises at such a distance, that the hunters lose all hopes of seeing it again. It is fat; and the flesh is tender, but, like that of the badger, rather of a fishy taste; the head, however, is not bad; and this agrees with what is said of the beaver, whose exterior parts have a taste like fish.

The cabiai is quiet and gentle: he is neither quarrelsome nor ferocious with other animals. It is easily tamed, comes at call, and willingly follows the hand that feeds it. We do not know the time of their bringing forth their young, their growth, and consequently the length of life of
this

this animal. They are very common in Guiana, as well as in Brasil, in Amazonia, and in all the lower countries of South America.

THE PORCUPINE.] The name of this animal leads us into an error, and makes many imagine, that it is only a hog covered with quills, when, in fact, it only resembles that animal by its grunting. In every other respect, it differs from the hog as much as any other animal, as well in outward appearance, as in the interior conformation. Instead of a long head and ears, armed with tusks, and terminated with a snout; instead of a cloven foot, furnished with hoofs like the hog, the porcupine has a short head like that of the beaver, with two large incisive teeth in the fore-part of each jaw; no tusks, or canine teeth; the muzzle is divided like that of the hare; the ears are round and flat, and the feet armed with nails; instead of a large stomach with an appendix in form of a caul, the porcupine has only a single stomach, with the large cœcum gut; the parts of generation are not apparent externally, as in the male hog; its testicles, and the other parts of generation, are likewise concealed in the body. By all these marks, as well as by its short tail, its long whiskers, and its divided lip, it partakes more of the hare, or beaver kind, than that of the hog. The hedgehog, indeed, who is, like the porcupine, covered with prickles, is somewhat resembling the hog; for it has a long muzzle, terminated by a kind of snout; but all these resemblances being very distant, it seems that the porcupine is a particular and different species from that of the hedgehog, the beaver, the hare, or any other animal with which it may be compared.

Travellers and naturalists have almost unanimously declared, that this animal has the faculty of discharging its quills, and wounding its foes at an immense distance; that these quills have the extraordinary and particular property of penetrating farther into the flesh, of their own accord and power, as soon as ever the point has made an entrance through the skin. These stories, however, are all purely imaginary, and without the smallest foundation or reason. The error seems to have arisen from this animal raising his prickles upright, when he is irritated; and, as there are some of them which are only inserted into the skin by a small pellicle, they easily fall off. We have seen many porcupines, but have never observed them dart any of their quills from them, although they were violently agitated. We cannot,

cannot, then, avoid being greatly astonished, that the greatest authors, both modern and ancient, as well as the most sensible travellers, have joined in believing a circumstance so entirely false. In justice, however, to Dr. Shaw, we must except him from the number of these credulous travellers : “ Of all the number of porcupines,” says he, “ which I “ have seen in Africa, I have never yet met with one “ which darts its quills, however strongly it was irritated, “ Their common method of defence is to lie on one side, “ and when the enemy approaches very near, to rise suddenly, and wound him with the points of the other.”

The porcupine, although a native of the hottest climate of Africa and India, lives and multiplies in colder countries, such as Persia, Spain and Italy. Agricola says, that the species was not transported into Europe before the last century. They are found in Spain, but more commonly in Italy, especially on the Appenine mountains, and in the environs of Rome.

The porcupine, in its domestic state, is neither furious nor vicious ; it is only anxious for its liberty ; and, with the assistance of its fore teeth, which are sharp and strong, like those of the beaver, it easily cuts through a wooden prison. It is also known, that it feeds willingly on fruits, chesnuts, and crumbs of bread ; that, in its wild state, it lives upon roots and wild grain ; that, when it can enter a garden, it makes great havock, eating the herbs, roots, fruit, &c. It becomes fat, like most other animals, towards the end of summer ; and its flesh, although insipid, is tolerable eating.

When the form, substance, and organization of the prickles of the porcupine are considered, they are found to be true quills, to which only feathers are wanting to make them exactly resemble those of birds. They strike together with a noise as the animal walks ; and it easily erects them in the same manner as the peacock spreads the feathers of his tail.

THE COUANDO, OR BRAZILLIAN PORCUPINE.] The porcupine, as has been observed, is a native of the hot countries of the Old World ; but, not having been found in the New, travellers have not hesitated to give its name to animals which seemed to resemble it, and particularly to that of which we are about to take notice. On the other hand, the Couando of America has been transported to the East Indies ; and Pison, who probably was not acquainted
with

with the porcupine, has engraved in Bontius the *couando* of America, under the name and description of the true porcupine. The *couando*, however, is not a porcupine, it being much less; its head and muzzle is shorter; it has no tuft on its head, nor slit in the upper lip; its quills are sometimes shorter and much finer; its tail is long, and that of the porcupine is very short; it is carnivorous, rather than frugivorous, and endeavours to surprise birds, small animals, and poultry, while the porcupine only feeds upon herbs, greens, fruits, &c. It sleeps all the day like the hedge-hog, and only stirs out in the night; it climbs up trees, and hangs in the branches by its tail, which the porcupine cannot do. All travellers agree, that its flesh is very good eating. It is easily tamed, and commonly lives in high places. These animals are found over all America, from Brasil and Guiana, to Louifiania and the southern parts of Canada; while the porcupine is only to be found in the hottest parts of the Old Continent.

In transferring the name of porcupine to the *couando*, they have supposed and transmitted to him the same faculties, especially that of lancing its quills. Ray is the only person who has denied these circumstances, although they evidently appear, at first view, to be absurd.

THE URSON, OR CANADA PORCUPINE.] This animal, placed by Nature in the desert part of North America, exists independent of, and far distant from, man. The *urson* might be called the *spiny beaver*, it being of the same size, the same country, and the same form of body; it has, like that, two long, strong, and sharp incisive teeth at the end of each jaw; its prickles are short, and almost covered with its hair; for the *urson*, like the beaver, has a double coat; the first consists of long and soft hair, and the second of a down, or felt, which is still softer and smoother. In the young *ursons*, the prickles are proportionably larger, more apparent, and the hair shorter and scarcer than in the adults.

This animal dislikes water, and is fearful of wetting itself. He makes his habitation under the roots of great hollow trees, sleeps very much, and chiefly feeds upon the bark of juniper. In winter, the snow serves him for drink; in summer, he laps water like a dog. The savages eat his flesh, and strip the bristles off the hide, which they make use of instead of pins and needles.

THE TANREC, and TENDRAC, or ASIATIC HEDGE-HOGS, are two small animals of the East Indies, which a little resemble our hedge-hog, but are sufficiently different to constitute a different species. What strongly proves this, is, their not rolling themselves up in the shape of a ball, like the hedge-hog; and where the tanrecs are found, as at Madagascar, hedge-hogs are also found of the same species as ours.

There appear to be tanrecs of two species, or perhaps of two different breeds. The first, which is nearly as large as our hedge-hog, has its muzzle proportionably longer; and its ears are more apparent, and less furnished with prickles, than those of the second, to which we have given the name of tendrac, to distinguish it from the first. The tendrac is not larger than a rat; its muzzle and its ears are shorter than those of the tanrec; which last is covered with shorter prickles, as numerous as those of the hedge-hog; whereas the tendrac has them only on the head, neck and shoulders, the rest of the body being covered with a coarse hair, resembling the bristles of an hog.

These little animals, whose legs are small, move but slowly; they grunt like an hog, and wallow, like it, in mire; they are chiefly in creeks and harbours of salt water; they multiply in great numbers, and make themselves holes in the ground, and sleep for several months. During this torpid state, their hair falls off, which is renewed upon their revival. They are usually very fat; and although their flesh be insipid, soft and spongy, yet the Indians find it to their taste, and consider it as a very great delicacy.

THE CAMELEOPARD is one of the tallest, most beautiful, and most harmless animals in nature. The enormous disproportion of its legs (the fore legs being as long again as the hinder ones) is a great obstacle to the use of its strength: its motion is waddling and stiff; it can neither fly from its enemies in its free state, nor serve its master in a domestic one. The species is not very numerous, and have always been confined to the deserts of Ethiopia, and some other provinces of Africa and India. As these countries were unknown to the Greeks, Aristotle makes no mention of this animal; but Pliny speaks of it, and Oppian describes it in a manner that is far from equivocal. “The
“cameleopard,” says this author, “has some resemblance
“to the camel: its head and ears are small, its feet broad,
“and its legs long; but the height of the last is very un-
“equal,

“ equal, the fore legs being much longer than the hinder;
 “ which are very short; so that, when the animal appears
 “ standing and at rest, it has somewhat the appearance of a
 “ dog sitting. There are two prominences upon the head,
 “ just between the ears; they resemble two small and strait
 “ horns. Its mouth is like the stag’s; its teeth small and
 “ white; its eyes full of fire; its tail short, and furnished
 “ with black hairs at its end.”

“ There is,” says Strabo, “ a large beast in Ethiopia,
 “ called *camelopardalis*; although it bears no resemblance
 “ to the panther, for its skin is not spotted in the same
 “ manner: the spots of the panther are orbicular, and
 “ those of this animal are long, and nearly resembling those
 “ of the fawn, or young stag.” Gillius’s description seems
 to me still better: “ I have seen,” says he, “ three cameleo-
 “ pards at Cairo. On their heads are two horns, six
 “ inches long; and, in the middle of their forehead, a
 “ tubercle rises to about the height of two inches, which
 “ appears like a third horn. This animal is sixteen feet
 “ high when he holds his head erect. Its neck alone is
 “ seven feet; and it is twenty feet long, from the tip of the
 “ nose to the end of the tail. Its fore and hind legs are
 “ nearly of an equal height; but the thighs before, are so
 “ long in comparison to those behind, that its back seems
 “ to slope like the roof of an house. Its whole body is
 “ sprinkled with large brown spots, which are nearly of the
 “ same form. Its feet are cloven like those of the ox.”

In inspecting the accounts travellers have given of the
 cameleopard, I find a tolerable agreement between them.
 They all agree, that it can reach with its head to the height
 of sixteen or seventeen feet, when standing erect; and that
 the fore legs are as high again as the hinder ones; so that it
 seems as if it were seated upon its crupper. They all like-
 wise agree, that they cannot run very swift, on account
 of this disproportion; that they are very gentle, and that
 by this quality, and even by the shape of the body, it par-
 takes more of the shape and nature of the camel than of any
 other animal; that it is among the number of ruminating
 animals, and, like them, is deficient of the incisive teeth in
 its upper jaw. By the testimonies of some, we find, that
 the cameleopard is to be met with in the southern parts of
 Africa, as well as in those of Asia.

It is very clear from what we have mentioned, that
 the cameleopard is a very different species from every other
 animal; but, if we referred it to any, it would be the camel,
 rather than the stag.

We are ignorant of the substance of the horns of the cameleopard; and in that part it may resemble the stag more than the ox, though possibly they may be neither solid, like those of the first, nor hollow, like those of the ox, goat, &c. Who knows but they may be composed of united hairs, like those of the rhinoceros, or of a substance and texture entirely peculiar to themselves. The horns of the cameleopard are surrounded with large, coarse hair, and not covered with a down or velvet, like those of the stag; which might incline us to suppose they were composed of united hair, nearly like those of the rhinoceros. The tubercle in the middle of the head seems to form a third horn, and is another strong circumstance in favour of this opinion. The two others, which are not pointed, but have mossy knobs at their ends, are perhaps only tubercles somewhat resembling the former. Travellers inform us, that the female cameleopards have horns like the males, with this difference only, that they are smaller. If this animal, therefore, was really of the stag kind, the analogy would be violated here likewise; for, of all such animals, there is only the female rein-deer that has horns.

THE LAMA, AND THE PACO.] There are examples, in every language, of two different names being applied to one and the same animal; one of which has a relation to its wild state, and the other to its domestic. The wild boar and the hog are only the same animal, under two names, which relate only to the condition of the species, of which one part is under the power of man, and the other independent of him: it is the same with respect to the lamas and the pacos, which were the only domestic animals of the ancient Americans. These names, then, belong to their domestic state; the wild lama is called *huanacus*, or *guanaco*; and the wild paco, *vicunna*, or *vigogne*. I supposed this remark necessary to avoid the confusion of names. These animals are not to be found in the Old Continent, but only belong to the New. They seem even to belong to some particular parts, beyond the limits of which they are never to be seen; they appear attached to the chain of mountains which stretch from New Spain to the Straights of Magellan; they inhabit the highest regions of the globe, and seem to require a purer and more rarefied air than that of our highest mountains.

It is very singular, that, although the lama and the paco are domesticated in Peru, Mexico and Chili, as the horses are in Europe, or the camels in Arabia, we scarcely know

any thing of them. Peru, according to Gregory de Bolivar, is the true and native country of the lamas; they are conducted into other provinces, as New Spain, &c. but this is rather for curiosity than utility; but in Peru, from Potosi to Curacas, these animals are in great numbers, and make the chief riches of the Indians and Spaniards, who rear them. Their flesh is excellent food; their hair, or rather wool, may be spun into beautiful clothing; and they are capable of carrying heavy loads in the most rugged and dangerous ways; the strongest of them will travel with two hundred, or two hundred and fifty pounds weight on their backs; their pace is but slow, and their journey is seldom above fifteen miles a day; but then they are sure, and descend precipices, and find footing among the most craggy rocks, where even men can scarcely accompany them; they commonly travel for five days together, when they are obliged to rest, which they do, of their own accord, for two or three days. They are chiefly employed in carrying the riches of the mines of Potosi. Bolivar affirms, that, in his time, above three hundred thousand of these animals were in actual employ.

The growth of the lama is very quick; and its life is but of short duration. This animal couples so early as at three years of age, and remains strong and vigorous till twelve; after which it begins to decline, and becomes entirely useless at fifteen. Their nature appears modelled on that of the Americans. They are gentle and phlegmatic, and do every thing with the greatest leisure and caution. When they stop on their journeys, they bend their knees very cautiously, in order to lower their bodies without disordering their load. As soon as they hear their driver whistle, they rise up again with the same precaution, and proceed on their journey; they feed as they go along on the grass they meet with in their way, but never eat in the night, making use of that time to ruminate. The lama sleeps, like the camel, with its feet folded under its belly, and ruminates in that posture. When overloaded or fatigued, it falls on its belly, and will not rise, though its driver strikes it with his utmost force.

The lama is about four feet high; its body, comprehending the neck and head, is five or six feet long; its neck alone is near three feet. The head is small and well proportioned, the eyes large, the nose somewhat long, the lips thick, the upper divided, and the lower a little depending: it wants the incisive and canine teeth in the upper jaw.

The

The ears are four inches long, and move with great agility. The tail is seldom above eight inches long, small, strait, and a little turned up at the end. It is cloven-footed, like the ox; but the hoof has a kind of spear-like appendage behind, which assists the animal to move and support itself over precipices and rugged ways. The back is clothed with a short wool, as is the crupper and tail; but it is very long on the belly and sides. These animals differ in colour; some are white, others black, but most of them brown.

These useful, and even necessary animals, are attended with no expence to their masters; for, as they are cloven-footed, they do not require to be shod, nor do they require to be housed, as their wool supplies them with a warm covering. Satisfied with a small portion of vegetables and grass, they want neither corn nor hay to subsist them; they are still more moderate in what they drink, as their mouths are continually moistened with saliva, which they have in a greater quantity than any other animal. The natives hunt the huanacus, or wild lama, for the sake of its fleece. The dogs have much trouble to follow them; and, if they do not come up with them before they gain the rocks, both the hunters and dogs are obliged to desist in their pursuit.

The pacos are a subordinate kind to the lamas, much in the same proportion as the ass is to the horse: they are smaller, and not so serviceable; but their fleece is more useful: their wool is fine and long, and is a sort of merchandise, as valuable as silk. The natural colour of the pacos is that of a dried rose-leaf, which is so fixed, that it undergoes no alteration under the hands of the manufacturer. They not only make good gloves and stockings of this wool, but also form it into quilts and carpets, which bring a higher price, and exceed those of the Levant.

The pacos also resemble the lamas in their form, excepting that their legs are shorter, and their muzzle thicker and closer. They inhabit and climb over the highest parts of the mountains. The snow and ice seem rather agreeable than inconvenient to them. When wild, they keep together in flocks, and run very swift; and, as soon as they perceive a stranger, they take flight, driving their young before them. The ancient monarchs of Peru rigorously prohibited the hunting of them, as they multiply but slowly; but, since the arrival of the Spaniards in these parts, their number is greatly decreased, so that at present there are very few remaining. The flesh of these animals is not so

good as that of the huanacus ; and they are only fought after for their fleece, and the bezoar they produce. The method of taking them, proves their extreme timidity, or rather their weakness. The hunters having driven the flock into a narrow passage, across which they have stretched a rope about four feet from the ground, with a number of pieces of linen or cloth hanging on it, the animals are so intimidated at these rags agitated by the wind, that they stop, and, crowding together in a heap, the hunters kill great numbers of them with the greatest ease ; but if there are any huanacus among the flock, which are less timid than the pacos, they leap over the rope with great agility. The example is immediately followed by the whole flock, and they escape the stratagem of their pursuers.

With respect to the domestic pacos, they are used to carry burdens, like the lamas ; but, being smaller and weaker, they carry much less weight. They are likewise of a more stubborn nature ; and, when once they rest with their load, they will suffer themselves to be cut to pieces sooner than rise. The Indians have never made use of the milk of these animals, as they have scarcely enough to supply their own young. The great profit derived from their wool, has induced the Spaniards to endeavour to naturalize them in Europe : they have transported them into Spain, in hopes to raise the breed in that country ; but, the climate not agreeing with their nature, not one of them lived : I am, nevertheless, persuaded, that these animals, which are more valuable than the lamas, might thrive upon our mountains, especially upon the Pyrenean. Those who brought them into Spain, did not consider that they can exist, even in Peru, only in the cold regions ; that is, on the top of the highest mountains ; that they are never to be found in the valleys, and die if brought into hot countries ; that, consequently, in order to preserve them, they should be landed, not in Spain, but in Scotland, and even in Norway, and with greater certainty at the foot of the Pyrenean, Alpine, or other mountains, where they might climb and attain to the region that most agrees with their nature.

THE UNAN, AND THE AI.] These two animals have the epithet of *stoth* given to them both, by most authors, on account of their slowness, and the difficulty with which they walk. The unan has no tail, and only two nails on the fore feet. The ai has a short tail, and three nails on every foot. The nose of the unan is likewise much longer, the

the forehead higher, and the ears longer than the ai. It differs also in the hair. As for the internal parts, its viscera are both formed and situated different; but the most distinctive, and, at the same time, the most singular character, is, that the unan has forty-six ribs, while the ai has but twenty-eight. This alone supposes two species, quite distinct one from the other; and these forty-six ribs, in an animal whose body is so short, is a kind of excess or error in nature; for, even in the largest animals, and those whose bodies are relatively longer than they are thick, not one of them is found to have so many. The elephant has only forty ribs, the horse thirty-six, the ram thirty, the dog twenty-six, and the human species twenty-four, &c. This difference in the construction of the unan and the ai, supposes a greater distance between these two kinds than there is between that of the cat and the dog, which have the same number of ribs; for the external differences are nothing in comparison with the internal ones, which are the causes of the others. These animals have neither incisive nor canine teeth; their eyes are dull and heavy; their mouths wide and thick; their fur coarse and staring, and like dried grass; their thighs seem almost disjointed from the haunch; their legs very short, and badly shaped; they have no soles to the feet, nor toes separately moveable, but only two or three claws, excessively long, and crooked downwards and backwards. Unfurnished with teeth, they cannot seize any prey, nor feed upon flesh, nor even upon vegetable food. Reduced to live on leaves and wild fruits, they take up a long time in crawling to a tree, and are still longer in climbing up to the branches. During this slow and painful labour, which sometimes lasts many days, they are obliged to support the most pressing hunger; and when, at length, one of them has accomplished its end, it fastens itself to the tree, crawls from branch to branch, and, by degrees, strips the whole tree of its foliage. In this manner, it remains several weeks without moistening its dry food with any liquid; and, when it has consumed its store, and the tree is entirely naked, yet unable to descend, it continues on it till hunger presses, and that becoming more powerful than the fear of danger or death, it drops, like a shapeless, heavy mass, to the ground, without being capable of exerting any effort to break the violence of its fall.

On the ground, these animals are exposed to all their enemies; and, as their flesh is not absolutely bad, they are

killed by men and beasts of prey. They seem to multiply but little, or, if they produce very often, it is only a small number, as they are furnished but with two teats; every thing concurs, therefore, to their destruction, and the species supports itself with great difficulty. It is true, that, although they are slow, heavy and almost incapable of motion, yet they are hardy, strong, and can abstain a long time from food; covered also with a thick and coarse fur, and unable scarcely to move, they waste but little, and fatten by rest, however poor and dry their food is. Although they have neither horns on their heads, nor hoofs to their feet, nor incisive teeth in the lower jaw, they are, notwithstanding, among the number of ruminating animals, and have, like them, four stomachs; so that they, consequently, can compensate for the quality of their food, by the quantity they take at a time; and, what is still more singular is, that, instead of having, like other ruminating animals, very long intestines, theirs are very short, like those of the carnivorous kind.

Both these animals belong to the southern parts of the New Continent, and are never to be met with in the Old. The unan, as well as the ai, is to be met with in the deserts of America, from Brasil to Mexico; but they have never inhabited the northern countries. They cannot endure cold nor rain; the change from wet to dry, spoils their fur, which then resembles badly-dressed hemp, rather than wool or hair.

THE SURIKAT.] This animal is a native of Surinam, and the other provinces of South America. It is very lively and subtle; it sometimes walks on its hinder legs, and often sits upright on them, with its fore paws hanging down by the side of its body. Its head is then erect, and moves upon the neck as on a pivot. It is not so big as a rabbit, and nearly resembles the marmose in size; its tail is somewhat longer, and its snout is more prominent and raised. It is more like the coati than any other animal. Its character likewise is nearly original, since it neither belongs to the coati, nor the hyæna. These two are the only animals who have four toes to every foot.

This animal eats raw meat with eagerness, and particularly poultry. It is fond of fish, and still more of eggs. It will eat neither fruit nor bread. It makes use of its fore feet, like the squirrel, to carry its food to its mouth; it laps its drink like a dog, and will not touch water, unless
it

it is luke-warm. Of one which I had in my possession, its common drink was its own urine, although of a very strong smell. It did not chew its food, but often scratched the brick or plaistered walls with its nails. It was so well tamed, that it answered to its name, when called; it went about the house like a cat, and had two voices; one like the barking of a young dog, when it was left long alone, or heard an unusual noise; on the contrary, when it was caressed, or when it shewed some token of pleasure, it made a noise as strong as that of a rattle briskly turned. It was a female animal, and only lived one winter, notwithstanding all the care that was taken to feed and keep it warm.

THE TARSIER is an animal remarkable for the length of its hind legs. The bones of the feet, and especially those which compose the upper part of the tarsus, are of an extraordinary size; and it is from this very character we have taken its name. It has five toes to every foot; it has, as I may say, four hands; for the toes are very long, and sufficiently divided: the largest of those behind, or the thumb, is terminated by a flat claw; and, although the claws of the other toes are pointed, they are, at the same time, so short and so small, they do not prevent the animal from using its fore feet like hands. The jerboa, on the contrary, has only four toes, and four long and crooked claws, on its fore feet; and, instead of a thumb, it has only a tubercle without any claw: but, what removes it farther from our tarsier, is, that it has only three fingers, or three great claws, in the hind feet.

THE PHALANGER.] These animals, which have been sent to us by the name of *Surinam rats*, have much less affinity with rats, than with the animals of the same climate of which we have given the history, under the names of the *marmose*, and *cayopoline*. As it has never been named by any artist or traveller, we have denominated it from its character, which is totally different from that of any other animal, and have called it *phalanger*, from its *phalanges* being singularly formed, and because its two fore toes are conjoined in such a manner, that this double toe appears like a hoof, separated only near the claws; the thumb is separated from the fingers, and has no claw at its extremity.

These animals vary in the colour of the hair; they are about the size of a small rabbit, or a very large rat, and are remarkable for the excessive length of their tail, snout,

and the form of their teeth, which alone is sufficient to distinguish the phalanger from the marmose, the fariga, the rat, and every other species of animals with which it may be supposed to relate.

THE COQUALLIN.] This animal was sent from America, by the name of the *orange-coloured squirrel*. It is, however, not a squirrel, although sufficiently resembling it by the shape of the tail; for it not only differs by many external characters, but also by its nature and manners.

The coquallin is much larger than the squirrel; it is a beautiful animal, and very remarkable for its colours, its belly being of a fine yellow, and its head, as well as body, varied with white, black, brown, and orange; it covers its back with its tail, like the squirrel, but has not, like that animal, small brushes of hair at the tips of the ears; it never climbs up any trees, and dwells in the hollows and under the roots of trees, like the animal we have termed *suisse*. In such places, it builds its nest, and rears up its young; it likewise stores its little habitation with corn and fruit, to feed on during the winter; it is a jealous and cunning animal, and so exceedingly wild, that it is impossible to be tamed.

The coquallin is only found in the southern parts of America; the white and orange-coloured squirrels of the East Indies are much smaller, and their colours uniform. These are true squirrels which climb up trees, and produce their young on them; while the coquallin, and the American *suisse*, burrow under ground, like rabbits, and have no other affinity with the squirrel, than a resemblance in the external form.

THE HAMSTER, OR GERMAN MARMOT, is one of the most famous, and most pernicious rats that exist. We have fed one of these animals for many months, and afterwards had it dissected, and observed, that the hamster resembled more the water-rat, than any other animal; it resembled it also in the smallness of its eyes, and the fineness of its hair; but its tail is not so long as that of a water-rat; but, on the contrary, it is much shorter than that of the short-tailed mouse. All these animals live under the earth, and seem to be animated with the same instinct; they have nearly the same habits, and particularly that of collecting corn, &c. and making great magazines in their holes.

The

The habitations of the hamsters are different, according to the sex, the age, and also the quality of the land they inhabit. That of the male hamster is an oblique passage, and at the entrance is a portion of earth thrown up. At a distance from this entrance, there is a single hole, which descends in a perpendicular manner to the chambers, or cavities, of the habitation. There is no hillock of earth near that hole; which makes us presume, that the oblique entrance is made hollow from the outside, and that the perpendicular hole, by which they come out, is worked within side, from the bottom to the top.

The habitation of the female has also an oblique passage, with two, three, and even eight perpendicular holes, by which the young ones may come in and go out. The male and the female have each their separate abode; that of the female is deeper than that of the male.

The perpendicular hole is the common passage for coming in and going out. By the oblique tour, they throw out the earth they scratch up. This passage also has a gentle declivity into some of the cavities, and another more steep into others, which serves for a free circulation of the air in this subterraneous habitation. The cavity where the female breeds her young, contains no provision, but only a nest formed of straw, or grass. The depth of the cavity is very different. The young hamster, of a year old, makes its burrow only a foot deep, while the old animal often hollows it to the depth of four or five feet. All the cavities communicate together in one habitation, which is about eight or ten feet diameter.

These animals store their magazines with dry clover, corn, and other grain; beans and pease they likewise provide themselves with; all these they are particularly careful to separate from the husk, which, with every other matter they do not make use of, they carry out of their habitation by their oblique passage.

The hamster commonly gets in its winter provisions at the latter end of August. When it has filled its magazines, it covers them over, and shuts the avenues to them carefully with earth. This precaution renders the discovery of these animals very difficult. The heaps of earth which they throw up before the oblique passage, are the only marks to trace their habitations. The most usual method of taking them, is by digging them out of their holes, which is attended with much trouble, on account of the depth and extent of their burrows: however, a man versed

in this business, commonly effects his purpose with good success. In autumn, he seldom fails of finding two good bushels of corn in each of their habitations; and he draws great profit from the skins of the animals. The hamsters bring forth their young two or three times in a year, and seldom less than five or six each time. Some years there are great numbers of them to be seen, and in others, scarcely any to be met with. They multiply in great numbers when the seasons are wet, which causes a great scarcity of grain, by the devastation these animals make.

The hamster begins to burrow at the age of six weeks, or two months; however, it never copulates in the first year of its growth.

The pole-cat is a great enemy to the hamsters, which he destroys in a great number; he not only pursues them on land, but follows them into their burrows, and feeds on them there.

The back of the hamster is commonly brown, and the belly black; however, there are some of a grey colour; and this difference may proceed from their age. Besides these, there are some often met with which are entirely black.

The hamsters destroy each other, like field-mice; two of them being put into the same cage, the female strangled the male in the night-time; and, having divided the muscles that held the jaws, she devoured great part of its viscera. There are numbers produced in one year, insomuch, that, in some parts of Germany, a reward is fixed on their heads. They are likewise in such great numbers, that their fur is sold exceedingly cheap.

THE BOBAK, AND OTHER MARMOTS.] The name of the *Straßbourg marmot* has been affixed to the hamster, and that of the *Poland marmot* to the bobak: but, it is certain, that the hamster is not a marmot; and it is also probable, that the bobak is one, as it only differs from the marmot of the Alps, by the colour of its fur, which is not quite so grey. There is a great claw, or toe, to the fore feet of the hamster, while the marmot has only four toes to each foot; but in other respects it perfectly resembles it, which makes us presume they do not form two distinct and separate species. It is the same with respect to the Canadian marmot, or monax, which some travellers have termed the *whistler*. It only seems to differ from the marmot by the tail, which is thicker of hair,

The

The Canadian monax, the Poland bobak, and the Alpine marmots, are, indeed, probably all the same kind of animal, under different denominations. As this species prefers the coldest and highest mountains in Poland, Russia, and other parts of the north of Europe, no wonder it is found in Canada, where it is only somewhat less than in Europe.

The Siberian animal also called by the Russians *Jevras Chka*, is a kind of marmot, still less than the Canadian monax.

JERBOA is a generical name, which we make use of in this place, to denote those remarkable animals whose legs are extremely disproportionate; those before being not above an inch long, and the others about two inches one fourth, exactly resembling those of a bird. There are four distinct species, or varieties of this kind. First, the *Tarsier*, which we have already spoken of, and which is certainly a particular species, as its toes are made like those of a monkey, having five on each foot. Secondly, the *Jerboa*, whose feet are like the *fissipedes*, with four claws on those before, and three on those behind. Thirdly, the *Alagtaga*, whose feet are formed like those of the jerboa, with this difference, that they have five toes on the fore, and three on the hinder feet, with a spur or a kind of thumb, or a fourth toe, much shorter than the others. Fourthly, the *Daman Israel*, or *Lamb of Israel*, which has four toes to the fore feet, and five to the hinder, which may possibly be the same animal which Linnæus has described by the name of *Mus Longipes*.

The head of the jerboa is sloped somewhat in the manner of a rabbit; but the eyes are larger, and the ears shorter, though elevated and open, with respect to its size: its nose and hair are of a flesh colour, its mouth short and thick, the orifice of the mouth very narrow, the upper jaw very full, the lower narrow and short, the teeth like those of the rabbit; the mustachos are composed of long black and white hairs; the fore feet are very short, and never touch the ground; they are furnished with four claws, which are only used as hands to carry the food to the animal's mouth; the hind feet have but three claws, the middle one longer than the other two; the tail is three times as large as its body, and is covered with short, stubborn hair, of the same colour as that on the back, but tufted at the end with longer and softer hair; the legs, nose and eyes are bare, and of a flesh colour; the upper part of the
head

head and back are covered with an ash-coloured hair; the sides, throat and belly are whitish; and below the loins, and near the tail, there is a large, black, transversal band, in form of a crescent.

These little animals commonly conceal their hands, or fore feet, within their hair; so that they are said, by some, to have only hinder feet. When they move from one place to another, they do not walk, that is, advance one foot before the other, but jump, or bound, about four or five feet at a time: this they do with the greatest ease and swiftness, holding themselves erect, after the manner of birds when they hop on the ground. They rest themselves in a kneeling posture, and only sleep in the day. In the night-time, they seek for their food, like hares, and, like them, feed on grass, corn, and other grain. They are of a gentle nature, but not to be tamed beyond a certain limit. They burrow like rabbits, and in much less time. They lay up store of grass, about the latter end of summer, in their habitations, and, in cold countries, remain in them during the winter. They are found in Syria, Phœnicia, Barbary, &c.

THE ICHNEUMON.] This animal is domestic in Egypt, like our cat; and, like that, is serviceable in destroying rats and mice; but, its inclination for prey, and its instinct is much stronger, and more extensive than the cat's; for it hunts alike, birds, quadrupeds, serpents, lizards, and insects; it attacks every living creature in general, and feeds entirely on animal flesh; its courage is equal to the sharpness of its appetite; it is neither frightened at the anger of the dog, nor the malice of the cat, nor even dreads the bite of the serpent; it pursues them with eagerness, seizes on and kills them, however venomous they may be. As soon as it begins to feel the impressions of their venom, it immediately goes in search of antidotes, and particularly a root that the Indians call by its name, and which, they say, is one of the most powerful remedies in nature, against the bite of the viper. It sucks the eggs of the crocodile, as well as those of fowls and birds; it also kills and feeds on young crocodiles, when they are scarcely come out of their shell; and, as fable commonly accompanies truth, it has been currently reported, that, by virtue of this antipathy, the ichneumon enters the body of the crocodile, when it is asleep, and never quits it till it has devoured its entrails.

Naturalists have supposed many kinds of ichneumons, because there are some larger than others, and of a different

coloured hair; but, if we consider, that, being frequently reared in houses, they have, like other domestic animals, undergone varieties, we shall readily perceive, that this diversity of colour, and this difference of size, only indicates simple varieties, not sufficient to constitute a separate species. It also appears, that the ichneumons in Egypt, which may be said to be domestic, are larger than those in India, which are in a wild state.

The ichneumon lives very willingly by the sides of rivers, inundations, and other waters. It quits its habitation to seek its prey near habitable places. It sometimes carries its head erect, foreshortens its body, and raises itself upon its hind legs; at other times, it creeps and lengthens itself like a serpent; it often sits upon its hind feet, and oftener springs upon its prey; its eyes are lively, and full of fire; its aspect is beautiful, the body very active, the legs short, the tail thick and very long, and the hair rough and bristly. Both male and female have a remarkable orifice, independent of the natural passages. It is a kind of pocket, into which an odoriferous liquor filters. They pretend, that it opens this bag, or pocket, to refresh itself when too hot. Its nose is very sharp, and its mouth narrow, which prevents it from seizing and biting any thing very large; but this defect is amply supplied by its agility, courage, and by its power; it very easily strangles a cat, although much bigger and stronger than itself; it often fights with dogs; and, of whatever size they are, it commonly gets the better of them.

THE FOSSAN is called, by some travellers, the *Genet* of *Madagascar*; but it is, in general, much smaller than the genet; and what proves to us its not being of that kind, is, that it has no odoriferous bag, the essential attribute belonging to that animal. Its manners are much like those of our pole-cat; and, when the male fossan is in heat, it emits a very strong smell, like musk. It eats both flesh and fruit, but prefers the last. It is a very wild animal, and very difficult to be tamed. The eye of the fossan represents a black globe, very large in comparison with the size of its head, which gives this animal a mischievous look.

The animal called *Berba* in Guinea, seems to be the same as the fossan, consequently this species exists in Africa, as well as in Asia.

THE VANSIRE.] Those who have spoken of this animal, have taken it for the ferret, which indeed it resembles in many respects, though it differs from it by characters strong enough to make it a distinct species. The vansire has twelve teeth, or grinders, in its upper jaw, while the ferret has only eight. The vansire also differs by the colour of its hair, from all ferrets; although those, like every other animal man is careful of rearing and increasing, vary much; both male and female.

The animal called by some the *Weasel of Java*, and by others the *Ferret of Java*, may possibly be the same as the vansire.

THE MAKI.] This name of Maki has been given to many different kinds of animals. The first class is the mocock, or maucaucau. The second is the mongooz, commonly called the *brown maki*; and the third kind is the vari, called by some the *pied maki*.

The maucaucau is a beautiful animal, remarkable for the largeness of its eyes, and the length of the hinder legs, which by far exceed those before; by its beautiful and long tail, which is continually elevated and in motion, and upon which are upwards of thirty rings, alternately black and white, all very distinct and separate one from the other. It is gentle; and, although it greatly resembles the monkey in many particulars, it is not so malicious in its nature. It is a gregarious animal, commonly found in company in its natural state; in Madagascar, thirty or forty are seen herding together. It sleeps in a sitting posture, with its snout resting upon its breast; its body is no thicker than that of a cat; but it is longer; and it appears larger, as the legs of the animal are very long. The hair is very soft, and stands almost upright.

The mongooz is less than the maucaucau; but its hair is, like that, of a short and filken nature, but a little curled; the nose is also thicker, and much resembling that of the vari. I had a mongooz in my possession for several years; its coat was of a brown colour, the eyes yellow, the nose black, and the ears short. It had a custom of playing with and biting its tail, and had, by this method, lessened it by four or five of the last vertebræ. Whenever it got loose, it visited the shops in the neighbourhood, and would make free with fruit, sugar, sweetmeats, &c. to obtain which, it would open the boxes. At such times, it was difficult to retake him; and it would bite those that attempted it, even its keeper.

The

The vari is much larger, stronger and wilder than the maucaucau, and is even exceedingly savage and mischievous in its free state. Travellers tell us, that these animals are as furious as tigers, and very difficult to be tamed; and that its voice is so very loud, that, when there are only two together in the woods, it might be imagined, that the noise they made, proceeded from an hundred. Its hair, in general, is much longer than that of the maucaucau; and it has a kind of ruff round the neck, consisting of very long hair. In other respects, its hair is black and white, and, although very long, stands nearly upright; its snout is thicker and longer than that of the maucaucau; its ears much shorter, and edged with long hair; and its eyes are of so deep an orange colour, that, if not minutely inspected, they appear to be red.

The maucaucau, the mongooz, and the vari, are all of the same country. They seem to be confined to Madagascar, Mozambia, and the neighbouring lands of these islands.

THE LORI is a little animal, found in Ceylon, very remarkable for the singularity of its conformation. It is, perhaps, of all animals, the longest in proportion to its size, having nine vertebræ in the loins; whereas other quadrupeds have only five, six, or seven. The body appears the longer, for having no tail. In other respects, it resembles those of the maki kind, as well in the hands and feet, as in the quality of the hair, the number of teeth, and the sharpness of its snout. This animal seems to be the same as that which Thevenot speaks of in the following terms:—"I saw," says he, "a monkey at Mogul, which had been brought thither from Ceylon. It was greatly valued on account of its size, it being not bigger than a man's fist. It is a different kind from the common monkey, having a flat forehead, eyes round and large, and of a bright yellow colour, like those of some cats; its snout is very pointed; the inside of the ears is yellow; and it had no tail. When I examined it, it sat erect on its hind feet, folded the others across its breast, and looked around it, at the spectators, without the least fear."

THE JAVELIN BAT.] The animal in question, we have denominated the *javelin bat*, from a sort of comb, or membrane, on its nose, which perfectly resembles the head of a lance. Although this character alone is nearly sufficient to distinguish

distinguish it from all other animals, yet we can add some others, as its having scarcely any tail, and its hair and size being nearly like the common bat, with this difference, that instead of having six incisive teeth in the lower jaw, it has only four. This kind of bat is very common in America, and never found in Europe.

There is another bat in Senegal, which has also a membrane upon its nose, not in the form of a horse-shoe, as in one species we have observed, or the head of a javelin, as in this, but in the shape of an oval leaf. These three bats, being of different climates, are not simple varieties, but distinct and separate species.

Bats, which have, in other respects, great affinity with birds, by their power of flying, and by the strength of the pectoral muscles, seem to resemble them still more in these membranes, or combs, which they have on their face; for most birds have also combs, or membranes, about their beak, or head, which seem, in every respect, as superfluous as those of the bat kind.

CHAP. XX.

Of the Serval—The Ocelot—The Margay—The Jackall, and the Adil—The Isatis—The Glutton—The Stinking Polecats—The Pekan, and the Vison—The Sable—The Leming—The Canadian Otter—The Seal—The Sea Lion—The Morse—The Dugon—The Manati.

THE SERVAL. **T**HIS animal has been kept alive several years in the royal menagerie, by the name of the *tiger cat*; and we should have still remained ignorant of its true name, if M. de Montmirail had not discovered it in the account of an Italian voyage, which he has translated:—"The *maraputia*, which the Portuguese "in India call *serval*," says Vincent Maria, "is a wild and "ferocious animal, much larger than the wild cat, and "something less than the civet, which it differs from by its "head being rounder and thicker in proportion to its "body, and its face sinking in about the middle of it. It "resembles the panther in the colour of the hair, which is "brown upon the head, back and sides, and white under "the belly; also in the spots, which are distinct, equally "distributed, and less than those of the panther; its eyes "are very brilliant; its whiskers are composed of long and
"stiff

“stiff bristles; its tail is short; its feet large, and armed with long and hooked claws. It lives among the mountains of India, and is very seldom seen on the ground; it remains almost continually upon high trees, where it catches birds, on which it feeds. It leaps also as nimbly as a monkey, and goes from one tree to another with such great address and agility, that it passes over a great space in a short time, and, we may say, only appears and disappears. It is ferocious in its nature, but flies at the sight of man.”

Neither captivity, nor good or bad treatment, will tame or soften the ferocity of this animal. It seems to be the same creature as the tiger-cat of Senegal and the Cape of Good Hope, which, according to the testimony of travellers, resembles our cat in its shape and size. “This animal,” they say, “is four times as large as a cat, of a voracious nature, and feeds like the monkey, the rat, &c.

THE OCELOT is a ferocious and carnivorous animal, which must be placed next the jaguar, or the cougar; for it is very near the size, and resembles them in its nature and figure. A male and female ocelot were shewn at the fair of St. Ovid, in September of 1764. They came from the countries adjoining to Carthagena, and had been taken from their mother in the month of October, 1763; they became so strong and cruel at three months old, as to devour the bitch which had nursed them. When we saw them, they were about a year old, and about two feet long. They had then, probably, only attained one half or two thirds of their growth. These animals were shewn by the name of the *tiger-cat*; but we have rejected this denomination as precarious and confused, especially as the jaguar, serval, and the margay, have been sent to us with the same name; those three animals are very different from each other, and from the animal we are at present treating of.

When the ocelot has arrived at its full growth, it is two feet and an half high, and about four feet long; the tail, although of a sufficient length, does not touch the ground when it is hanging down, and consequently is not two feet long. This animal is very voracious, but at the same time timid; he very seldom attacks the human species, and is terrified at the sight of a dog. When it is pursued, it flies to the forests, and climbs up a tree to save itself, where it sleeps, and watches for its prey, on which it springs when within its command; it prefers blood to flesh; and this is the

the reason why it destroys such a number of animals; for, instead of satisfying its hunger by devouring them, it only quenches its thirst by sucking their blood.

In its captive state, it preserves its ferocious nature; nothing can tame it, nor calm its restless motion, which obliges its keeper to confine it constantly in a cage.

THE MARGAY is much smaller than the ocelot. It resembles the wild cat in the size and shape of its body; its head only is more square, its snout longer, its ears rounder, and its tail longer; its hair also is shorter, and it has black streaks and spots on a brown ground. It was sent us from Cayen, by the name of the *tiger-cat*; and, in fact, it partakes of the nature of the cat and the jaguar, or the ocelot, which are the two animals to which the name of tiger has been affixed in the New Continent. According to Fernandes, when this animal has arrived at its full growth, it is not quite so large as the civet; and, according to Marcgrave, whose comparison is juster, it is about the size of a wild cat, which it also resembles in its natural habits, living only upon fowls, and other small game; but it is very difficult to be tamed, and never loses its natural ferocity; it varies greatly in its colours, though commonly it is such as we have here described it. This animal is very common in Brasil, and in all the other provinces of South America.

THE JACKAL, AND THE ADIL.] We are not certain, that these two names denote two animals of different species. We only know that the jackal is a larger animal, which is more ferocious, and difficult to be tamed, than the adil. By the writings of travellers, it appears, that there are both great and small jackals, as well in America, as in Silesia, Russia, and in every part of Asia, which we call the Levant, where this species is very numerous, very troublesome, and very hurtful. These animals are generally about the size of our foxes; but their legs are shorter; and they are remarkable for the colour of their hair, which is of a glossy and bright yellow. This is the reason why many authors have called the jackal the *golden wolf*. As both the jackal and the adil, however, are natives of the same countries; as the species has not been altered by a long domesticity, and as there is a considerable difference in the size, and even in the nature of these animals, we shall look on them as two distinct species, with the reserve of uniting them, when we shall



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shall have occasion to prove, that they cohabit and copulate together.

As the species of the wolf approaches that of the dog, so the jackal finds a place between them both. The *jackal*, or *adil*, as Belon says, is a *beast between the wolf and the dog*. To the ferocity of the wolf, it joins, in fact, a little of the familiarity of the dog. Its voice is a kind of a howl, mixed with barking and groaning; it is more noisy than the dog, and more voracious than the wolf; it never stirs out alone, but always in packs, of twenty, thirty, or forty; they collect together every day, to go in search of their prey; they make themselves formidable to the most powerful animals, by their number; they attack every kind of beasts or birds, almost in the presence of the human species; they abruptly enter stables, sheepfolds, and other places, without any sign of fear; and when they cannot meet with any other thing, they will devour boots, shoes, harnesses, &c. and what leather they have not time to consume, they take away with them. When they cannot meet with any live prey, they dig up the dead carcases of men and animals. The natives are obliged to cover the graves of the dead with large thorns, and other things, to prevent them from scratching and digging up the dead bodies. The dead are buried very deep in the earth; for it is not a little trouble that discourages them. Numbers of them work together, and accompany their labour with a doleful cry; and, when they are once accustomed to feed on dead bodies, they run from country to country, follow armies, and keep close to the caravans. This animal may be stiled the crow of quadrupeds; for they will eat the most putrid or infectious flesh: their appetite is so constant, and so vehement, that the driest leather is savory to them; and skin, flesh, fat, excrement, or the most putrified animal, is alike to their taste.

The *ISATIS* is very commonly seen in the northern countries, and but rarely found on this side sixty-nine degrees latitude; it is nearly two feet in length; it perfectly resembles the fox, in the form of its body, and the length of the tail; but its head is like that of a dog: its hair is softer than that of the common fox; its head is short in proportion to its body; it is broad towards the neck, and terminates in a sharp-pointed snout. Its ears are almost round. There are five toes and five claws to the fore feet, and only four toes and four claws to the hinder ones. The hair on

every part of the body is about the length of two inches, smooth and soft as wool.

The voice of the ifatis partakes of the barking of the dog, and the yelping of the fox. Those who deal in furs, distinguish two animals of this kind, the one white, and the other ash-coloured: the last are the most valuable.

The ifatis lives upon rats, hares, and birds, which it catches with as much subtilty as the fox. It plunges in the water, and traverses the lakes, in search of water-fowls and their eggs. The only enemy it has in the desert and cold countries which it inhabits, is the glutton.

THE GLUTTON. The body of the glutton is thick, and its legs short. It is nearly of the size of a ram, but as thick again; its head is short, its eyes small, its teeth very strong, its tail rather short, and covered with hairs to its extremity; it is black along the back, and of a reddish brown on the flanks; its fur is exceedingly beautiful, and much valued. It is common in Lapland, and all the neighbouring countries of the Northern Sea, as well in Europe as in Asia. It is called *Carcajou* in Canada, and the northernmost parts of America. The animal indicated by Fernandes, by the name of the *Mountain Dog*, is probably of the glutton species, which possibly is dispersed as far as the desert mountains of New Spain.

The legs of the glutton are not formed for running; its pace is very slow; but its cunning supplies this deficiency; it waits the arrival of its prey in ambush; and, in order to seize it with greater security, it climbs up a tree, from which it darts down on the elk and the rein deer, and fastens itself so strongly with its claws and teeth, that all the efforts of the animal cannot remove it. The poor animal in vain flies with its utmost speed; in vain it rubs itself against trees, and other objects; all is useless: fastened on its back or loins, the glutton still persists in tormenting it, by digging into its flesh, and sucking its blood, till the animal, fainting with loss of blood, falls; then the glutton devours it by piecemeal, with the utmost avidity and obstinate cruelty. It is inconceivable, what a length of time together the glutton will eat, and what a quantity of flesh it will devour at one single meal.

From this quality, the glutton has obtained the name of the *Quadruped Vulture*. It is more insatiable, and commits greater depredations, than the wolf; it would destroy every
animal,

animal, if it had sufficient agility; but the only animal it is capable of taking on foot, is the beaver, which it easily destroys: it even often attacks that animal in its hole, and devours both it and its young, if they do not get to the water in time; for then the beaver escapes its enemy by swimming, and the glutton stops its pursuit to feed upon the fish. When it is deprived of any living food, it goes in search of carcases, scratches open graves, and devours the flesh of dead bodies to the very bone.

Although this animal is subtle, and uses every art to conquer other animals, it seems to have not the least instinct for its own preservation. It suffers the human species to approach it without the least appearance of fear. This indifference, which seems to shew its imbecility, is occasioned, perhaps, by a very different cause; it is certain, that the glutton is not a stupid animal, since it readily finds means to satisfy its perpetual and almost immediate appetite; it does not want for courage, since it attacks every animal indifferently that comes in its way, and does not fly at the sight of man, nor even shew the least mark of spontaneous fear. If, therefore, it is deficient in a proper care for its own safety, it does not arise from an indifference for its preservation, but only from its habit of security, as it is a native of almost every desert country, where it seldom meets with any of the human species.

As the isatis is not so strong, but much swifter than the glutton, it serves the latter as a purveyor, following it in its pursuit of animals, and often depriving it of its prey, before it has devoured it; or, at least, partaking of it; for, the moment the glutton approaches, the isatis, to avoid destruction itself, leaves what remains, for the glutton to feed on. Both these animals burrow in the ground; but in every other habit they are different. The isatis often goes in flocks, while the glutton moves alone, or sometimes with its female: they are often found together in their burrows. The fiercest dogs are fearful of attacking the glutton, which defends itself with its teeth and feet, and often mortally wounds them.

The flesh of the glutton, like that of every other voracious animal, is very bad food. It is only hunted after for its skin, which makes an exceedingly good and beautiful fur, not inferior to the sable and black fox. It is also said, that, when properly chosen and well dressed, it has a more excellent gloss than any other skin, and even has the beauty of a rich damask.

THE STINKING POLECATS are found in every part of South America. They may be divided into four species; the *squash*, the *conepate*, the *skink*, and the *zorille*: the two last may be regarded as originals, as we do not meet with their figure in any other author.

The first of these animals is about sixteen inches long; its legs are short, its snout pointed, its ears small, its hair of a deep brown, and its claws black and sharp. It chiefly dwells in the hollows and clefts of rocks, where it brings forth its young. It preys upon small animals, birds, &c. and when it can steal into a farm-yard, it kills the poultry, but eats only their brains. When it is pursued or offended, it calls up all its diabolical scents to its defence, and sends forth such a horrid stench, that it is dangerous for men or dogs to approach it. Its urine is apparently infected with this nauseous vapour, which, however, we must observe, does not seem habitual to it.

Among the four kinds of *stinkards* we have above indicated by the names of the *squash*, *conepate*, *skink*, and *zorille*, the two last belong to the hottest countries of South America, and may possibly be no more than two varieties, and not two different species. The two first are varieties of New Spain, Louisiana, Carolina, and other temperate climates, and seem to me to be two distinct and different species from the others; but principally the *squash*, which has a particular character, of having only four claws on the fore feet, whereas all the rest have five; but, in every other respect, these animals have nearly the same figure, the same instinct, the same offensive scent, and only differ, as I may say, by the colour and length of the hair. The *squash*, as has been observed, is of a pretty uniform brown colour, and its tail is not tufted like the rest. The *conepate* has five white stripes on a black ground, running longitudinally from the head to the tail. The *skink* is white on the back, and black on the sides, but quite black on the head, excepting a white streak, which runs from the nape of the neck to the forehead. Its tail is tufted, and clothed with very long white hairs, mixed with some of a black colour.

The *zorille*, which is also called *mauripita*, is still smaller, and has a most beautiful tail, furnished with as great abundance of hair as the *skink*, from which it differs by the disposition of the spots on its coat, the white streaks running longitudinally from the head to the middle of the back, on a black ground; besides which, there are other kinds of streaks, which pass transversely over the loins, the crupper, and

and the insertion of the tail, one half of which is black and the other white, whereas in the skink they are all of the same colour.

Kalm, speaking of this animal says, “one of them came near the farm where I lived. It was in winter time, and during the night, and the dogs that were upon the watch, pursued it for some time, until it discharged its urine against them. Although I was in my bed a good way off, I thought I should have been suffocated, and the cows and oxen themselves, by their lowings, shewed how much they were affected by the stench. About the end of the same year, another of those animals crept into our cellar, but did not exhale the smallest scent, because it was not disturbed. A foolish woman, however, who perceived it at night, by the shining of its eyes, killed it, and at that moment its stench began to spread. The whole cellar was filled with it to such a degree, that the woman kept her bed for several days after, and all the meat, bread, and other provisions, that were kept there, were so infected, that they were obliged to be thrown out of doors.”

All these animals are nearly of the same form and size as the European polecat; they resemble it also by its natural habits; and the physical results of their generation are the same.

THE PEKAN AND THE VISON.] The fur merchants of Canada have long been acquainted with the name of pekan, without any knowledge of the animal to which it belongs. We are also ignorant of the origin of the name of the *vison* as well as of the *pekan*, and it is only said that they belong to two different animals of South America.

The pekan so strongly resembles the marten, and the vison the pole-cat, that we are inclined to look on them as varieties of these two species: and to regard the pekan as a variety in the species of the marten, and the vison as a variety in that of the pole-cat, or, at least to consider them as species approaching so near each other, that they do not present any real difference: the hair of the pekan and the vison is only more soft, brown and glossy than that of the marten and pole-cat, but this difference, as is known, is common to them as well as to the beaver, otter, and other animals of North America, whose fur is more beautiful than that of those of the same kind of animals in the north of Europe.

THE SABLE.] Almost every naturalist has spoken of this animal without knowing any thing more of it than its skin. Mr. Gmelin is the first who has given its figure and description: he saw two living ones at the governor of Tobolski's. "The sable, (says he) resembles the marten in its shape and habit of body, and the weasel in the number of its teeth: it has large whiskers about the mouth, its feet are broad, and armed with five claws, like the rest of its kind. These characters were common to these two sables; but one of them was of a dark brown, excepting the ears and the throat, where the hair was rather yellow; the other, which was smaller, was more of a yellowish cast, its ears and throat being also much paler. These are the colours they both have in winter, and which they are seen to change in the spring; the former becoming of a yellow brown, the other of a pale yellow."

These animals inhabit the banks of rivers in shady places, and in the thickest woods: they leap with great ease from tree to tree, and are said to be afraid of the sun, which tarnishes the lustre of their robes in a very short time. They are also improperly said by some, to hide themselves, and remain torpid during the winter, when it is the chief time they are hunted, and in which they are only in season, as their skins are much finer and better at that time than in summer: they live on rats, fish, and wild fruit: they have the disagreeable odour of their kind, which is strongest during the time their heat is on them: they are mostly found in Siberia, and but very few in Russia, and there are still fewer in Lapland and other countries. The blackest skins are the most esteemed. The difference of this skin from others, consists in the quality of the fur, which has no grain, and rubbed any way, is equally smooth and unresisting; whereas, the furs of other animals, rubbed against the grain, give a sensation of roughness from their resistance.

The hunting of the sable falls to the lot of condemned criminals, who are sent from Russia into these wild and extensive forests, which, for a great part of the year, are covered with snow: these unfortunate wretches remain there many years, and are obliged to furnish a certain number of skins every year: they only kill this animal by a single ball, in order to damage it as little as possible; and sometimes, instead of fire arms, they make use of the cross-bow and very small pointed arrows. As the success of this hunting trade, supposes address and great assiduity, the officers are permitted to encourage the hunters, by allowing them to share

share among themselves the surplus of those skins which they procure; and this, in the process of a few years, amounts to a very considerable sum.

The LEMING, or LAPLAND MARMOT, is of the shape of a mouse, but has a shorter tail: its body is about the length of five inches, covered with fine hair of various colours. The extremity of the upper part of the head is black, as are the neck and shoulders; but the rest of the body is reddish, intermixed with small black spots of various figures: the tail, which is not above half an inch long, is covered with brownish hairs, and the spots vary, also both in their form and size. In some there are many red hairs about the mouth, resembling whiskers, six of which are longer and redder than the rest. The mouth is but small, and the upper lip is divided like the squirrel's. The remains of the food in the throat of this animal, incline us to imagine it ruminates. The eyes are small and black; the ears round, and inclining towards the neck; the legs before are short, and those behind longer, which gives it a greater degree of swiftness; the feet are clothed with hair, and armed with five very sharp and crooked claws; the middle claw is very long, and the fifth is like a little finger, or the spur of a cock, sometimes placed very high up the leg. The colour of the hair on the belly is whitish, bordering a little on yellow, &c. This animal, therefore, whose legs are very short, runs very swift. It generally inhabits the mountains of Norway and Lapland, but descends in such great numbers in some years, and in some seasons, that the inhabitants look on their arrival as a terrible scourge, from which there is no possibility of deliverance. They move, for the most part, in a square, marching forward by night, and lying still by day. Thus, like an animated torrent, they are often seen more than a mile broad, covering the ground, and that so thick, that the hindmost touches its leader. It is in vain, that the inhabitants resist, or attempt to stop their progress; they still keep moving forward; and though thousands are destroyed, myriads are seen to succeed and make their destruction impracticable: they generally move in lines, which are about three feet from each other, and exactly parallel: their march is always directed from the north-west to the south-west, and regularly conducted from the beginning. Wherever their motions are turned, nothing can stop them; they go directly forward, impelled by some strange power; and from the time they at first set out, they never think of retreating. If a lake, or a river, happens to

interrupt their progress, they all together take the water and swim over it; a fire, a deep well, or a torrent, does not turn them out of their strait lined direction; they boldly plunge into the flames, or leap down the well, and are sometimes seen climbing up on the other side. If they are interrupted by a boat across the river while they are swimming, they never attempt to swim round it, but mount directly up its sides; and the boatmen, who know how vain resistance would be, calmly suffer the living torrent to pass over, which it does without farther damage. If they meet with a stack of hay or corn which interrupts their passage, instead of going over it, they gnaw their way through; if they are stopped by a house in their course, if they cannot get through it, they continue there till they die. It is happy, however, that they eat nothing that is prepared for human subsistence: they never enter an house to destroy the provisions, but are contented with eating every root and vegetable that they meet. If they happen to pass through a meadow, they destroy it in a very short time, and give it an appearance of being burnt up and strewed with ashes. If, they are interrupted in their course, and a man should imprudently venture to attack one of them, the little animal is no way intimidated by the disparity of strength, but furiously flies up at its opponent, and barking somewhat like a puppy, wherever it fastens it does not easily quit its hold: if, at last, the leader is found out of its line, which it defends as long as it can, and be separated from the rest of its kind, it sets up a plaintive cry, different from that of anger, and, as some say, gives itself a voluntary death, by hanging itself on the fork of a tree.

An enemy so numerous and destructive, would quickly render the countries where they appear utterly uninhabitable, did it not fortunately happen, that the same rapacity that animates them to destroy the labours of mankind, at last impels them to destroy each other. After committing incredible devastations, they are at last seen to separate into two armies, opposed with deadly hatred along the coasts of the larger lakes and rivers. The Laplanders, who observe them thus drawn up to fight, instead of considering their mutual animosities as an happy riddance of the most dreadful pest, form ominous prognostics from the manner of their engagements: they consider their combats as a presage of war, and expect an invasion from the Russians or Swedes, as the side, next those kingdoms happen to conquer. The two divisions, however, continue their engagements and animosity until one part overcomes the other: from that

time they utterly disappear, nor is it well known what becomes of either the conquerors, or the conquered. Some suppose, that they rush headlong into the sea; others, that they kill themselves; as some are found hanging on the forked branches of a tree; and others, that they are destroyed by the young spring herbage. But the most probable opinion is, that having devoured the vegetable productions of the country, and having nothing more to subsist on, they then fall to devouring each other, and having habituated themselves to that kind of food, continue it. However this be, they are often found dead by thousands, and their carcases have been known to infect the air for several miles round; so as to produce very malignant disorders: they seem also to infect the plants they have gnawed, for the cattle often die that afterwards feed in the places where they passed. The inhabitants have an opinion, as they do not know whence such numbers proceed, that they fall with the rain.

As for the rest, the male is generally larger and more beautifully spotted than the females: they go in droves into the water; but no sooner does a storm of wind arise, than they are all drowned. The flesh of the leming is horrid food, and their skin, although covered with a very beautiful fur, is of too little consistence to be serviceable.

THE CANADIAN OTTER.] This otter, which is much larger than the common otter, must be a native of the north of Europe, as well as of Canada. It appears to be larger and blacker than the common otter; but is rather a variety than a distinct species.

THE SEAL]. This animal has its head round, like that of the human species; its snout is broad, like the otter's; the eyes large and elevated; little or no external signs of ears, only two auditory passages in the sides of the head: it has whiskers about its mouth, and its teeth somewhat resemble those of the wolf; the tongue is forked at the point; the body, hands, and feet, covered with a short and bristly hair; it has no legs, but two feet, or membranes, like hands, with five toes, terminated by as many claws: these membranes, which have the appearance of hands, are only larger and turned backwards, as if designed to unite with its very short tail, which they accompany on both sides. The body is thickest where the neck is joined to it, whence the animal tapers down to the tail like a fish. This amphibious animal, though of a very different nature from that of our domestic animals,

animals, yet seems to be susceptible of a kind of education: it is fed by putting it often in water: it is taught to salute persons with its head and its voice; it is accustomed to obey the call of its keeper, and gives many other signs of intelligence and docility.

The sensations of the seal are as perfect, and its sagacity as ready, as those of any other quadruped: both the one and the other are strongly marked by its docility, its social qualities, its strong instinct for its female, its great attention towards its young, and by its voice, which is more expressive, and more modulated, than in other animals: its body is likewise firm and large: it is also strong, and armed with very sharp teeth and claws, and has many particular and singular advantages over any other animal we can compare with it: it endures both heat and cold, and feeds indifferently on grass, flesh, or fish; it can equally live on ice, land, or in the water. This animal and the morse are the only quadrupeds which deserve the name of *Amphibious*, or which have the *foramen ovale* open, consequently, they are the only animals which can exist without respiration, and to which the watery element is as agreeable as that of the air.

But these advantages, which are very great, are counterbalanced by imperfections still greater: they may be said to be deprived of the use of their fore-legs, or membranes; they are almost entirely shut up within its body, while nothing appears but the extremities of them, which are furnished with five toes, scarcely moveable, being united together by a very strong membrane, so that they might more properly be called fins than feet, as they are more adapted for the purpose of swimming than walking, the hind-feet, indeed, being turned backwards, are entirely useless upon land; so that when the animal is obliged to move, it drags itself forward like a reptile, and with an effort more painful; for it cannot twist itself about like the serpent, but lies like a lump on the earth, and by grasping whatever it finds in its reach, drags itself up the steepest shores, rocks, and shoals of ice: by this method it moves with such a degree of swiftness, that a man cannot overtake it; it makes its way towards the sea, and often, though wounded, escapes the pursuit of the hunter.

The seal is a social animal, and generally found in great numbers in the places they frequent: their natural climate is the northern, but they are also met with in the temperate and even hot countries; for they are seen on the shores of almost all the seas in the universe. The species alone seems to vary, and, according to the difference of climates, chan-

ges its colour and even its shape. We have seen some of these animals alive, and many of their skins have been sent to us : out of these we have chosen two for our present subject; the first, the seal of our European Sea, of which there are many varieties : the proportions of the body seem different from those of any other, its tail being shorter, its body longer, and its claws larger ; but these differences are not considerable enough to make it a separate and distinct species. The second, the seal of the Mediterranean and southern seas, and which we presume to be the *phoca* of the ancients, seems to be of another species, for it differs from every other, both in the quality and colour of the hair, which is almost black, whereas in the other kind it is grey and bristly ; its teeth and ears are also different ; and its arms, or fins, are also situated lower, that is, more backward ; nevertheless, these disagreements, perhaps, are only varieties dependent on the climate, and not specific differences, though there are numbers of these animals in those parts to be found, larger, smaller, thicker, or thinner, and of a different coloured hair, according to their sex and age.

The females of these animals bring forth in winter, and rear their young upon some sand-bank, rock, or small island, at some distance from the continent. When they suckle their young, they sit upon their hinder legs, and they continue with their dam for twelve or fifteen days, after which she brings them down to the water, accustoms them to swim, and get their food by their own industry. As each litter, never exceeds above three or four, so the animal's cares are not much divided, and the education of her little ones is soon completed. The young particularly distinguish their mother's voice among the numerous bleatings of the old ones, and are perfectly obedient to her call. We are unacquainted with the time of the female's gestation ; but, if we judge from the time of their growth, the length of their lives, and the size of the animals, it will appear to be many months : the time also that intervenes, from their birth till they attain their full growth, being many years, the length of their lives also must be very long. I am of opinion, that these animals live upwards of an hundred years ; for we know, that cetaceous animals in general live much longer than quadrupeds ; and as the seal fills up the chasm between the one and the other, it must participate of the nature of the first, and, consequently live much longer than the latter.

The voice of the seal may be compared to the barking of an angry dog. When young, they have a shrill note, somewhat

what like the mewing of a cat: those that are taken early from their dams, mew continually, and very often die sooner than take the food that is offered them. These animals in general, are of a courageous nature. It is remarked, that instead of being terrified at thunder and lightning, they are rather delighted, generally come on shore in tempests and storms, and even quit their icy abodes to avoid the shock of the tempestuous waves: at such times, they sport in great numbers along the shore; the tremendous conflict seems to divert them, and the heavy rains that fall appear to enliven them: they have naturally a disagreeable scent, and when there are great numbers together, it is smelt at a great distance. It often happens, that when pursued, they drop their excrements, which are of a yellow colour, and of a very abominable scent. As they have a prodigious quantity of blood, and are also greatly overloaded with fat, they are, consequently of a very dull and heavy nature: they usually sleep soundly, and are fond of taking their repose on flakes of ice, or sides of rocks, at which time, the hunters approach very near without disturbing them, and this is the usual method of taking them: they are very seldom killed with fire-arms; for, as they do not immediately die, even if they are shot in the head, they plunge into the sea, and are entirely lost to the hunter; the general method therefore is, to surprize them when asleep, and knock them on the head. "They are not easily killed, and are a long time dying (says a modern traveller) for although they are mortally wounded, and their blood nearly exhausted, and even stripped of their skins, yet they still continue alive; indeed, it is a disagreeable sight to see these animals wounded and skinned, wallowing and rolling about in their blood in the greatest agonies. These remarks were made on the animals we killed, which were about eight feet long, for, after they were skinned, and even deprived of a great part of their fat, yet they attempted to bite their butchers, notwithstanding they had given them many powerful blows over the head and nose. One of them even seized a lance which was presented to it, with as much eagerness as if it had not been wounded; after which we pierced it through the heart and liver, whence as much blood flowed as is contained in a young ox."

THE SEA LION.] To the species of seals as above described we may, with great propriety add another animal, described in Anson's voyages, by the name of the *sea lion*. They are found

found in great numbers on the coasts of the south sea. The sea lion resembles our sea calf, which is very common in the same latitude, but they are much larger than any of the former, being from eleven to eighteen feet long, and from eight to eleven in circumference. It is so fat, that when the skin is taken off, the blubber is about a foot thick all round the body. About ninety gallons of oil is drawn from one of these animals; they are at the same time very full of blood, and when deeply wounded in many parts of the body, the blood spouts out with amazing power: the throat of one of these animals being cut, it afforded two barrels of blood, besides what then remained in its body. Its skin is covered with a short hair of a brownish colour, but blackish on the tail and feet: their toes are united by a membrane which does not reach to their extremity; each of the toes is known by a claw. The sea lion differs from the seal, not only in its size and bulk, but also in some other characters; the male has a kind of thick comb or trunk hanging from the end of their upper jaw, about five or six inches long. This character is not seen in the female. The strongest males collect together a flock of females, and hinder the others from approaching them. These animals are truly amphibious; they remain all the summer in the sea, and go on shore in winter, at which season the females bring forth their young, but never above one or two at a litter, which they suckle, like the seal.

The sea lions, while they are on shore, feed on the grass by the sides of the sea: they are of a very heavy and drowsy nature, and delight to sleep in the mire: but they are very wary, and at those times commonly fix some as centinels near the place where they sleep; and it is said, that these centinels are very careful to awake them when any danger is near. Their voices are very shrill, and of various tones: sometimes grunting like hogs, and sometimes neighing like horses. The males often fight with each other, when they wound one another desperately with their teeth. The flesh of these animals is not disagreeable to eat; particularly the tongue, which is as good as that of the ox. They are very easily killed, as they cannot defend themselves, nor fly from their enemies: they are so exceedingly heavy, that they move with great difficulty, and turn themselves about with still greater. Those that hunt them have only to guard against their teeth, which are very strong, and which they make use of with powerful effect on those who approach within their reach.

By comparing other observations and accounts, the sea lion of South America, appears to be nearly the same, as that

that found on the northern coasts of the same continent. The great seal of the Canadian sea, spoken of by Davis, by the name of the sea wolf, and which he distinguishes from the common sea calf, might possibly be the same as the sea lion we are speaking of. Their young, says this author, are larger and longer than our largest hog.

THE MORSE, OR SEA-COW.] The name of sea-cow, by which the morse is most generally known, has been very wrongly applied; since the animal which it denotes has not the least resemblance to the land-cow: the denomination of sea-elephant, which others have given it, is much better imagined, as it is founded on a singular and very apparent character. The morse, like the elephant, has two large ivory tusks, which shoot from the upper jaw; its head also is formed, or rather deformed, like that of the elephant, and would entirely resemble it in that part if it had a trunk; but the morse is deprived of that instrument which serves the elephant in the place of an arm and hand, and has real arms to make use of. These members, like those of the seal, are shut up within the skin, so that nothing appears outwardly but its hands and feet: its body is long and tapering, thickest towards the neck: the whole body is cloathed with a short hair; the toes, and the hands, or feet, are covered with a membrane, and terminated by short and sharp-pointed claws. On each side of the mouth are large bristles in the form of whiskers: its tongue is hollowed, the concha of the ears are wanting, &c. so that, excepting the two great tusks, and the cutting teeth, which it is deficient in above and below, the morse in every other particular perfectly resembles the seal; it is only much larger and stronger, the morse being commonly from twelve to sixteen feet in length, and eight or nine in circumference; whereas, the largest seals are no more than seven or eight feet. The morses also are generally seen to frequent the same places as the seals are known to reside in, and are almost always found together. They have the same habitudes in every respect, excepting that there are fewer varieties of the morse than the seal: they likewise are more attached to one particular climate, and are rarely found except in the northern seas.

“ There was formerly, says Zordrager, great plenty of
 “ morses and seals in the bays of Horisont and Klock, but
 “ at present there are very few. Both these animals quit
 “ the water in the summer, and resort to the neighbouring
 “ plains, where there are flocks of them from eighty to two
 “ hundred,

“ hundred, particularly morses, which will remain there
“ several days together, till hunger obliges them to return
“ to the sea. This animal externally resembles the seal,
“ but it is stronger and much larger: like that, it has five
“ toes to each paw, but its claws are shorter, and its head
“ thicker and rounder; its skin is thick, wrinkled, and co-
“ vered with very short hair of different colours: its upper
“ jaw is armed with two teeth about half an ell or an ell in
“ length; these tusks, which are hollow at the root, become
“ larger as the animal grows older. Some of them are found
“ to have but one, the other being torn out in fighting with
“ each other, or perhaps fallen out through age. This
“ ivory generally brings a greater price than that of the ele-
“ phant, as it is of a more compact and harder substance.
“ The mouth of this animal is like that of the ox, and fur-
“ nished with hairs which are hollow, pointed, and about
“ the thickness of a straw. Above the mouth are two nos-
“ trils, through which the animal spouts the water like
“ a whale. There are a great number of morses towards
“ Spitzbergen, and the profit that is derived from their teeth
“ and fat fully repays the trouble, for the oil is almost as
“ much valued as that produced from the whale. When
“ the hunter is near one of these animals in the water, or on
“ the ice, he darts a very strong harpoon at it, which
“ though made expressly for the purpose, often slips over
“ its hard and thick skin; but if it has penetrated into it,
“ they haul the animal towards the boat, and kill it with a
“ very sharp and strong lance. The morse is generally hea-
“ vyer than the ox, and as difficult to pursue as the whale,
“ the skin of which is more easily pierced, and a strong and
“ sharp lance is often darted several times at the morse,
“ without penetrating it. For this reason, they always en-
“ deavour to wound it in the most tender part, and aim at
“ its eyes: the animal, obliged by this motion to turn its
“ head, exposes its breast to the hunter, who immediately
“ strikes it very forcibly in that part, and draws the lance
“ out again as quick as possible, for fear it should seize the
“ lance with its teeth, and wound those that attack it. For-
“ merly, before these animals were so greatly persecuted,
“ they advanced so far on shore, that when it was high wa-
“ ter, they were at a great distance from the sea; and at
“ low water, being at a still greater, the hunters easily ap-
“ proached them and killed great numbers. The hunters,
“ in order to cut off their retreat to the sea, and after they
“ had killed several, made a kind of barrier of their dead
“ bodies, and in this manner, often killed three or four
“ hundred,

“ hundred in a season. The prodigious quantity of bones
 “ spread over the shores, sufficiently prove how numerous
 “ these animals were in former times. When they are
 “ wounded, they become extremely furious, often biting
 “ the lances in pieces with their teeth, or tearing them out
 “ of the hands of their enemies; and when at last they are
 “ strongly engaged, they put their head betwixt their paws,
 “ or fins, and in this manner roll into the sea. When
 “ there is a great number together, they are so bold as to
 “ attack the boats that pursue them, bite them with their
 “ teeth, and exert all their strength to overturn them.”

We find the morse can live, at least for some time, in a temperate climate. We do not know how long it goes with young, but if we judge by the time of its growth and size, we must suppose it to be upwards of nine months. The morse cannot continue in the water for a long time together, and is obliged to go on shore to suckle its young, and for other occasions. When they meet with a steep shore, or pieces of ice to climb up, they make use of their tusks to hold by, and their feet to drag along the heavy mass of their body; they are said to feed upon the shell-fish which are at the bottom of the sea, and to grub them up with their strong tusks. Others say, that they live on the broad leaves of a certain vegetable which grows in the sea, and that they eat neither flesh nor fish. But I imagine all these opinions have but a weak foundation; and there is reason to think, that the morse, like the seal, lives on prey, especially herrings and other fish; for it does not eat at all when upon land, and it is chiefly hunger which obliges them to return to the sea.

THE DUGON.] The dugon is an animal which inhabits the African and Indian seas. Some travellers have confounded it with the sea lion, and other travellers seem to have indicated it by the name of the sea bear; Spilberg and Mandelso recount “ that there are animals on the island of
 “ St. Elizabeth, on the coast of Africa, which should rather be denominated sea bears than sea wolves, as their
 “ hair, colour and head, greatly resemble those of that animal, the snout only being more pointed. They also
 “ move alike with their fore legs, but drag the hind ones
 “ after them; in other respects these amphibious animals
 “ have a frightful appearance, and do not shew any fear at
 “ the sight of man: their teeth are so very strong, as to
 “ enable them to bite through the stock of an halberd, and
 “ although their hind legs appear crippled, yet they are able
 “ to

“ to move with such swiftness, that it is very difficult to
 “ come up with them.” “ Le Guat also speaks of having
 “ seen a sea cow of a reddish colour, near the Cape of Good
 “ Hope; its body was round and thick, its eyes full and
 “ large, its teeth or long tusks, and its muzzle were turned
 “ a little upwards.”

THE MANATI.] This animal may be indiscriminately called the last of beasts or the first of fishes. It cannot be called a quadruped; nor can it entirely be termed a fish: it partakes of the nature of the fish by its two feet or hands, but the hind legs, which are almost wholly concealed in the bodies of the seal and morse, are entirely wanting in the manati: instead of two short feet and a small narrow tail, which is placed in an horizontal direction in the morse, the manati has only a thick tail, spread out broad like a fan. Oviedo seems to be the first author who has given any sort of history or description of the manati; he says, “ it is a very
 “ clumsy and mishapen animal, the head of which is thicker
 “ than that of an ox, the eyes small, and the two feet or
 “ hands are placed near the head for the purpose of swim-
 “ ming. It has no scales, but is covered with a skin or ra-
 “ ther a thick hide with a few hairs or bristles: it is a peace-
 “ able animal, and feeds upon the herbage by the river sides,
 “ without entirely leaving the water, swimming on the sur-
 “ face of it to seek its food. The hunters practise the fol-
 “ lowing method to take the manati; they row themselves
 “ in a boat or raft as near the animal as possible, and dart
 “ a very strong lance into it, to the end of which a very
 “ long cord is fastened; the manati feeling itself wounded,
 “ instantly swims away, or plunges to the bottom: but the
 “ cord which holds the lance, has a cork or piece of wood
 “ fastened to the end of it, to serve as a buoy; when the
 “ animal begins to grow faint and weak through the loss of
 “ blood, he swims to shore; the cord is then wound up,
 “ and the animal drawn within arms length of the boat,
 “ where they dispatch it in the water by strokes of the oar
 “ or lance. It is so very heavy, as to be a sufficient load
 “ for two oxen to draw; its flesh is excellent eating, which
 “ is eaten rather as beef, than as fish. Some of these ani-
 “ mals measure more than fifteen feet in length by six feet
 “ in breadth: the body becomes narrower towards the tail,
 “ and then spreads gradually broader towards the end. As
 “ the Spaniards, adds Oviedo, give the appellation of hands
 “ to the feet of quadrupeds, and as this animal has only
 X “ fore

“ fore feet, they have given it the name of *manati*, i. e. an
 “ animal with hands. The female has breasts placed for-
 “ ward like those of a woman, and she generally brings
 “ forth two young ones at a time, which she suckles. The
 “ flesh and fat of this animal (says M. de Condamine)
 “ have a great resemblance to veal. It is not, properly
 “ speaking, amphibious, since it never entirely leaves the
 “ water, having only two flat fins, close to the head, about
 “ sixteen inches long, and which serve the animal instead
 “ of arms and hands. It only raises its head out of the wa-
 “ ter to feed on the herbage by the sea-side. The eyes of
 “ this animal have no proportion to the size of its body; the
 “ orifice of its ears is still less, and only seems like a hole
 “ made by a pin. The manati is not particular to the Ama-
 “ zonian river; for it is not less common in Oroonoko:
 “ it is found also, though less frequently, in the Oyapoc,
 “ and many other rivers in the environs of Cayen, and the
 “ Coast of Guiana, and probably, in other parts.”

The manati species, however, is not confined to the seas and rivers of the New World, but is found also in those of Africa.

CHAP XXI.

Of Monkeys—The Orang-Outang—The Pigmy—The Gibbon, or long-armed Ape—The Magot.—The Baboon—The Mandril.—The Wanderow and Lowando—The Maimon.—The Maccaco and Egret—The Patas—The Malbrouck and Chinese Bonnet—The Mangeaby—The Mona—The Callitrix—The Mustache—The Talapoin—The Douc—American Monkeys—The Warine and Alouatto—The Coaita and Exquima—The Capuchin Monkey—The Weeper—The Orange Monkey—The Suki—The Tamarin—The Westiti—The Marikine—The Pinch—The Mico.

THE ORANG-OUTANG, OR THE PONGO AND THE JOCKO.] Orang-Outang is the name this animal bears in the East Indies; *Pongo*, its denomination at Lowando, a province of Congo; and *Kukurlacks* in some parts of the East Indies. We shall present the orang-outang and the jocko together, because they are, possibly, but one and the same species. We have seen the small orang-outang, or the jocko, alive, and we have preserved its skin, but we can only speak of the pongo, or great orang-outang, from the accounts

accounts travellers have given us of it. Battel assures us, that, excepting his size, the pongo is exactly like a man in all his proportions: he is as tall (he says) as a giant: his face is like that of a man, the eyes deep sunk in the head, the hair on each side extremely long, the visage naked and without hair, as are also the ears and the hands; the body is lightly covered, and scarcely differing from that of a man, except that there are no calves to the legs. Still, however, the animal, is seen to walk on his hinder legs: he sleeps under trees, and builds himself a hut, which serves to protect him against the sun and the rains of the tropical climates, of which he is a native: he lives only upon fruits, and is not carnivorous: he cannot speak, although furnished with greater instinct than any other animal of the brute creation. When the Negroes make a fire in the woods, this animal comes near and warms himself by the blaze: he has not, however, skill enough to keep the flame alive by feeding it with fuel. They go together in companies, and if they happen to meet with one of the human species, remote from succour, they shew him no mercy. They even attack the elephant, which they beat with their clubs, and oblige to leave that part of the forest which they claim as their own. It is impossible to take any of these creatures alive, they are so strong. None of this kind, therefore, are taken, except when very young, and then but rarely, when the female happens to leave them behind; for, in general, they cling to the breast, and adhere both with legs and arms. There are two kinds of this animal both very much resembling the human race, the pongo, which is taller and thicker than a man; and the jocko, whose size is much smaller, &c. The apes of Guinea, (says Bosman) which are called *Smitten* by the Flemings, are of a brown colour, and grow to a very large size. I have seen some above five feet tall: these apes are of a very disagreeable appearance, as well as those of another kind, which resemble them in every particular, excepting in size, which is a fourth part less than that of the former: they are very easily taught to do almost whatever their masters please." Schouten says, "That the animals which the Indians call orang-outangs, are almost all of the same height and shape as mankind, but that their back and loins are covered with hair, of which however, there is a deficiency in the fore part of the body; that the females have two breasts; that the face is rough, the

“ nose flat, and the ears like those of a man ; that they are
 “ robust, active, bold, and defend themselves even against
 “ armed men ; that they are passionately fond of women,
 “ and that there is no safety for them in passing through the
 “ woods they inhabit, as these animals immediately attack
 “ and injure them.” To these testimonies we may add that
 of M. de la Bresse, mentioned in his Voyage to Anjou.
 This traveller assures us, “ that the orang-outangs, which
 “ he calls *Quimpeazes*, often attempt to surprize the female
 “ negroes, which they keep with them for the pleasure
 “ of their company, feeding them very plentifully all the
 “ time. I knew (says he) a woman of Louango that had
 “ lived among these animals for three years. They grow
 “ from six to seven feet high, and are of unequalled strength.
 “ They build sheds, and make use of clubs for their de-
 “ fence : their faces are broad, their noses flat, their ears
 “ without a tip, their skins are fairer than that of a Mulat-
 “ toe, but they are covered on many parts of their body
 “ with long and tawny-coloured hair : their belly is ex-
 “ tremely large, their heels flat, and yet rising behind about
 “ half an inch : they sometimes walk upright, and some-
 “ times upon all four when they are phantastically disposed.
 “ We purchased two of these animals, one about fourteen
 “ months old, which was a male, and a female about twelve
 “ months.”

The orang outang which I saw, walked always upright,
 even when it carried heavy burthens. Its air was melan-
 choly, its deportment grave, its nature more gentle and very
 different from that of other apes. Unlike the baboon, or
 the monkey, whose motions are violent, and appetites ca-
 pricious ; who are fond of mischief, and only obedient
 through fear, a look was sufficient to keep it in awe. I have
 seen it give its hand to show the company to the door, that
 came to see it, and it would walk about gravely with them,
 as if one of the society. I have seen it sit at table, unfold its
 napkin, wipe its lips, make use of the spoon and the fork to
 carry the victuals to its mouth, pour out its drink into a
 glass, touch glasses when invited, take a cup and saucer and
 lay them on the table, put in sugar, pour out its tea, leave
 it to cool before drinking, and all this without any other
 instigation than the signs or the command of its master, and
 often of its own accord. It was gentle and inoffensive : it
 even approached strangers with respect, and came rather to
 receive caresses than to offer injuries : it ate almost of every
 thing that was offered to it, but it preferred dry and ripe fruits

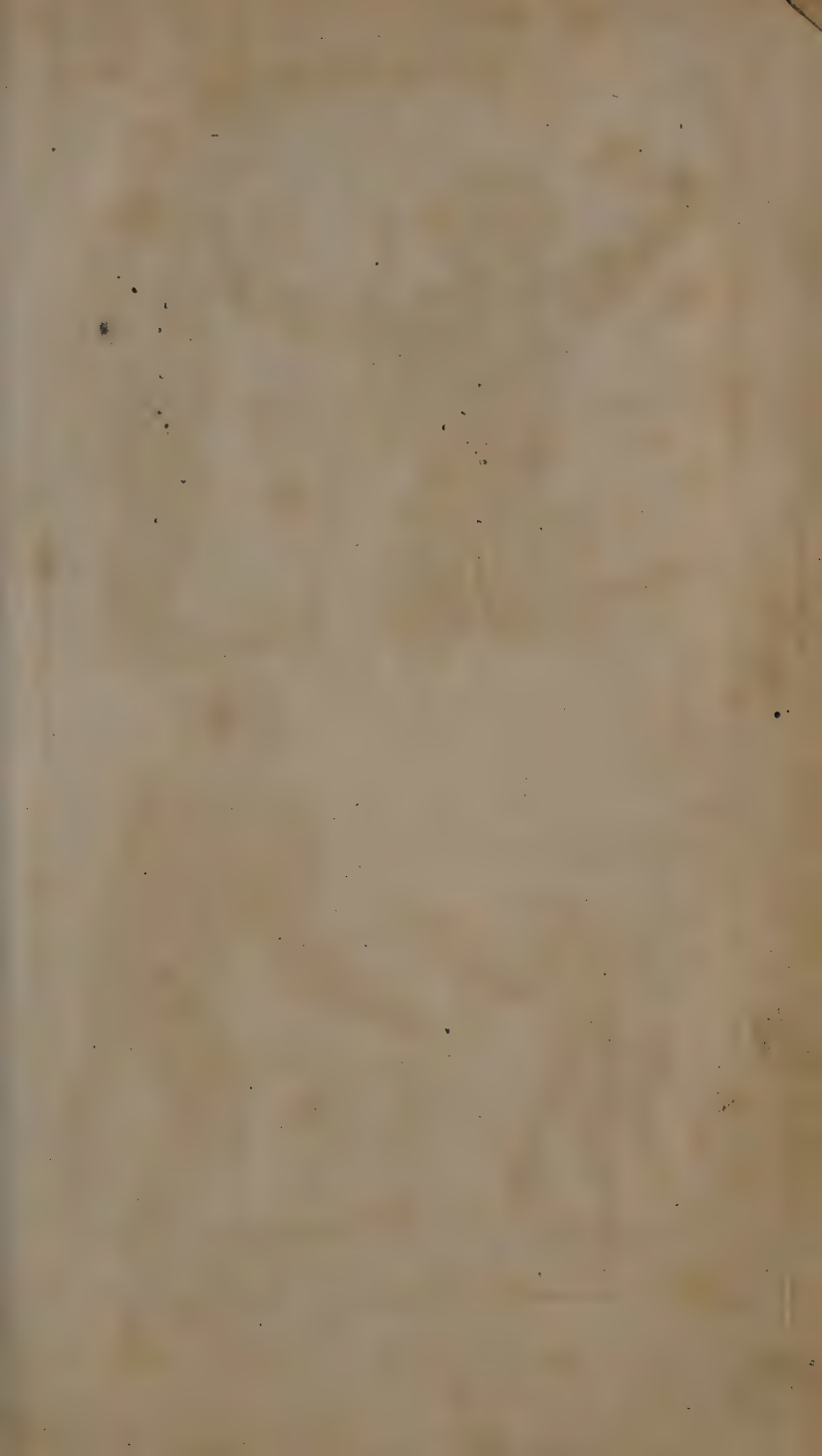
to all other aliments. It would drink wine, but in small quantities, and willingly left it for milk, or any other sweet liquor. Mr. L. Brosse, who bought two young ones that were but a year old from a negro, relates that, "even at that age they sat at table, ate of every thing without distinction, made use of their knife, spoon, and fork, both to eat their meat and help themselves: they drank wine and other liquors. We carried them on ship-board, and when they were at table, they made signs to the cabin-boys expressive of their wants; and whenever they neglected attending upon them as they desired, they instantly flew into a passion, seized them by the arm, bit them, and kept them down. The male was sea-sick, and required attendance like an human creature: he was even twice bled in the right arm; and every time afterwards when he found himself indisposed, he shewed his arm, as desirous of being relieved by bleeding."

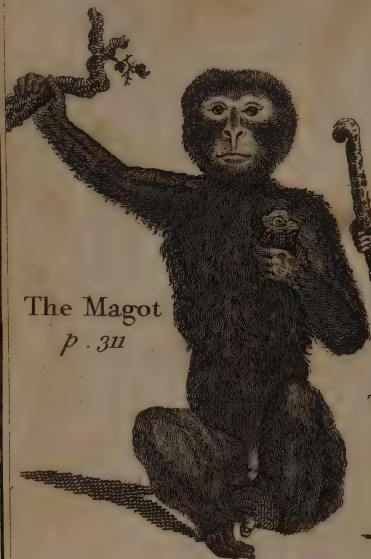
Henry Grose relates, "that these animals are met with to the north of Coromandel; that Mr. Horne, governor of Bombay, had two of them sent him, a male and a female; they were scarcely two feet high, but their form was entirely like the human: they walked erect upon their two feet, and were of a pale colour, without any hairs on any other part than where mankind generally have them: their actions perfectly resembled the human, and their melancholy plainly evinced how strongly they felt the weight of their captivity: they made their bed very carefully in the cage in which they were sent on board the ship. When any person looked at them, they hid those parts with their hands, which modesty forbids the sight of. The female (adds he) died on board, and the male shewed all real signs of grief, and took the death of his companion so greatly to heart, that he refused his food, and did not survive her more than two days."

Francis Pyrard relates, "that in the province of Sierra Leona, in Africa, there are a kind of apes called *Barris*, which are strong and muscular, and so very industrious, that, if properly fed and instructed when young, they serve as very useful domestics: they usually walk upright, will pound at the mortar, fetch water from the river in a little pitcher, which they carry on their heads; but, if care be not taken to receive the pitcher at their return, they let it fall to the ground, and then, seeing it broken, they begin to lament and cry for the loss."

THE PITHECOS OR PIGMY.] By the testimonies of the ancients, the pithecos seems to be the most gentle and docile of all the monkey kind that was known to them : it was common in Asia, as well as in Lybia, and in the other provinces of Africa, frequented by the Greek and Roman travellers. And this has made me presume, that we must refer the animals mentioned by Leo the African, and Marmot, to this kind. " These animals (says Marmot) have " feet and hands, and if I may be allowed the expression, " a human face, with an appearance of much vivacity and " malice: they live upon corn, herbage, and all sorts of " fruits; to obtain which they sally forth in large bodies, " and plunder the gardens or villages. Before they venture " out on this expedition, one of the company ascends an " eminence, and surveys the country round. If there is no " appearance of any person near, he makes signs to his companions to enter the vineyard or orchard, and begin their " plunder: but as soon as the centinel perceives any one " coming, he instantly sets up a loud cry, and the whole " company scampers off with the utmost precipitation, and " jumping from tree to tree, retreat to the mountains. It " is a great curiosity to see these animals retreat; for the " females carry four or five young ones upon their backs, " and with this heavy load leap with great agility from " branch to branch, though great numbers of them are " taken notwithstanding all their cunning. When they are " angry, they bite; but while they are coaxed, they are " very tame. Those that are tamed, perform things almost " incredible, and imitate mankind in almost every action " they see them do." The pithecos has no tail; its canine teeth are not proportionably longer than those of mankind; its face is flat, as is likewise its nails, which are rounded at top, like those of a man; it walks erect, is about a cubit high, and of a gentle and tractable disposition.

THE GIBBON, OR LONG-ARMED APE.] The gibbon always keeps its erect posture, even when it walks upon all fours, its arms being as long as its body and legs put together. We have seen one of these animals alive; it was but young, and not then more than three feet high; though we must presume, that it had not attained its full size, but that when it is adult, and in its free state, it is at least four feet. It had no appearance of any tail; it had a circle of grey bushy hair all round the face, which gave it a very remarkable appearance: its eyes were large and sunk in its head,

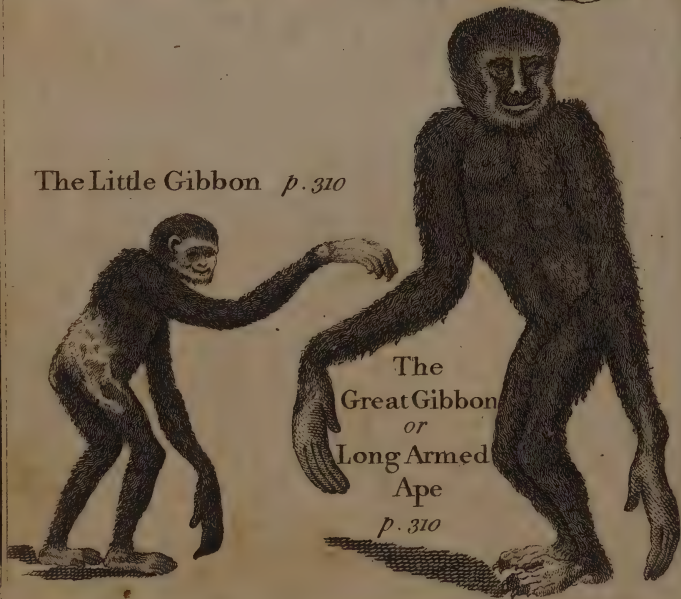




The Magot
p. 311



The Jocko
p. 306



The Little Gibbon p. 310

The
Great Gibbon
or
Long Armed
Ape
p. 310

head, its face resembling that of a man, tanned, and its ears well proportioned. This ape appeared to us to be of a gentle and tractable disposition; its motions were neither rash, nor precipitate. It was fed on bread, fruit, almonds, &c. and calmly received the food that was presented to it: it was very averse to cold and wet weather, and did not live long after being brought from its native country. It is a native of the East-Indies, and particularly found along the coasts of Comorandel, Malacca, and the Molucca islands.

THE MAGOT.] Of all the apes which have no tail, this animal can best endure the temperature of our climate. We have kept one for many years. In the summer, it remained in the open air with pleasure; and in the winter, might be kept in a room without any fire. It was filthy, and of a sullen disposition: it equally made use of grimace to shew its anger, or express its sense of hunger: its motions were violent, its manners awkward, and its physiognomy rather ugly than ridiculous. Whenever it was offended, it grinned and shewed its teeth. It put whatever was given to it into the pouches on each side of its jaws, and commonly eat every thing that was offered to it, except raw flesh, cheese, and other things of a fermentative nature. When it slept, it was fond of roosting on a wooden or iron bar. It was always kept chained, for, notwithstanding its long subjection, it was neither civilized, nor fond of its keeper: apparently, it had been but badly educated, for I have seen others of the same kind who were more sagacious, obedient, gayer, and so tractable as to be taught to dance, and suffer themselves quietly to be clothed and dressed.

This ape is about two feet and an half, or three feet high, in its erect posture; but the female is not so large as the male. It rather chuses to walk on all fours, than erect. When it sleeps, it is almost always sitting. There are two very prominent callosities on its posteriors. It differs also from the *pithecos*; first, in the form of its snout, which is thicker and longer, like that of a dog; whereas, the *pithecos* has a flat visage, like the human. Secondly, in having long canine teeth; instead of which the *pithecos* has them no longer in proportion than those of a man. Thirdly, in its nails, which are neither so flat nor so round; and, in short, it is larger, and of a more sullen and untractable disposition than the other.

It is probably, this kind of monkey which Robert Lade speaks of in the following terms: "We travelled over a great

“ mountain at the Cape of Good Hope, where we diverted
 “ ourselves with hunting the large apes, which are there in
 “ great plenty. I am not able to represent all the tractable-
 “ ness of these animals which pursued us, nor the swiftness
 “ and impudence with which they returned to us after we
 “ had driven them away. Sometimes they suffered us to
 “ approach so near them, that, stopping almost close to one
 “ of these animals to take my observations, I thought myself
 “ certain of securing him, when, taking a sudden leap, he
 “ sprang above ten paces from me, and climbed up a tree
 “ with the greatest agility. They remained afterwards very
 “ quiet, looking on us as though they were pleased with our
 “ astonishment. There were some so exceedingly large,
 “ that if they had been of a ferocious nature, our number
 “ would not have been sufficient to secure us from their at-
 “ tacks. As it would have been useless to kill these ani-
 “ mals, we made no use of our guns; but the captain,
 “ thinking to wound one of them, which was seated on a
 “ tree, after a long pursuit, had no sooner presented his
 “ piece, but the animal, probably from the remembrance
 “ of the execution of some of his companions in the same
 “ manner, was so greatly terrified at it, that it fell almost
 “ motionless at our feet, and being stunned in the fall, we
 “ had not the least trouble to secure it: however, when it
 “ revived, we had occasion for all our strength and address
 “ to keep it, defending itself by biting those who were near
 “ it, which obliged us to bind our handkerchiefs over its
 “ head.”

THE BABOON, properly so called, has a pouch on each
 side of its cheeks: it has callosities on its posteriors, which
 are naked and of a red colour: its tail is crooked and thick,
 and about seven or eight inches long. The canine teeth are
 much thicker and longer than those of men. Its snout is
 very thick and very long; its ears naked; its body and
 limbs are strong, thick, and short; its hair is long and thick,
 of a reddish brown colour, and pretty uniform over the whole
 body. It walks oftener on all fours than upright, and is
 from three to four feet high; but there seem to be different
 sizes of these animals. The female brings forth usually but
 one at a time, which she carries in her arms, and in a pe-
 culiar manner clinging to her breast: in other respects, these
 baboons, although mischievous and ferocious, are not car-
 nivoracious; they principally feed upon fruits, roots, and corn;
 they generally keep together in companies, and sally forth to
 commit



The
Male Mandrill

p. 313

The
Female Mandrill

p. 313



The Macacco

p. 314

The Wanderow p. 313

commit their depredations on the neighbouring vineyards, or orchards. " As they are extremely fond of grapes, apples, and ripe fruit, they assemble together in great numbers, and proceed on their enterprize with previous deliberation. The dogs who are set to watch, do not easily conquer these animals, as they are extremely active, and make dextrous use of their teeth and claws. On these occasions, a part of them enter the inclosure, while one of the company stands sentinel; the rest stand without the fence, a small distance from each other, and form a line, reaching all the way from the inclosure to the rendezvous without, which is generally in some craggy mountain. Every thing being thus disposed, the plunderers within the orchard throw the fruit to them without as fast as they can gather it: or, if the wall or hedge be high, to those that sit at the top, and these hand the plunder to those next their side.

THE MANDRIL.] This baboon is an ugly, disgusting animal, which has two nostrils independent of its nose, from whence is always seen issuing a thick matter. Its muzzle is still longer than the preceding; it is of a bluish colour, and strongly seamed with wrinkles, which still encreases its frightful and loathsome appearance.

This baboon is found on the Gold Coast, and in other southern provinces of Africa, where the Negroes call it *Boggo*, and the Europeans *Mandrill*. This animal is the largest of the baboon kind. Smith relates, that a female mandril was given to him, which was not above six months old, and had then attained the size of an adult baboon: he likewise acquaints us, that these animals walk always erect; that they sigh and cry, like the human species; that they have a violent passion for the female sex; and that they never fail to overcome them, if they find them within their reach.

THE WANDEROW, AND THE LOWANDO.] As these two animals seem to be but one and the same species, we have, therefore, here preserved the two names they bear in Ceylon, as they at least form two distinct breeds. The body of the wanderow is covered with brown and black hairs, and has a long white head of hair, and a monstrous white beard: the body of the lowando, on the contrary, is covered with whitish hairs, but has the like large head of hair and beard. There is still a third variety found in the same country, which may, possibly, be the common stock of the other two, because it is of an uniform white colour over its body,
with

with the like head of hair and beard : these animals are baboons, and not, as some have imagined, monkeys, as they have all the characters, as well in shape as in disposition, and are of the same savage nature, and even more ferocious.

“ The white monkies (says Forbin) are sometimes as big
 “ as the largest English mastiff : they are more dangerous
 “ than the black : they principally attack women, and often,
 “ after having greatly injured them, finish their cruelty by
 “ strangling. Sometimes they even come to their houses ;
 “ but the Macaroes, who are very jealous of their wives,
 “ take care to prevent their entrance into their habitations ;
 “ and the females not liking (as the chevalier humorously
 “ relates) either the manners or the figure of the paltry
 “ gallants, boldly stand on their defence, and with clubs,
 “ or whatever other arms they can provide, instead of an-
 “ swering their caresses, oblige their ugly suitors to return,
 “ not, however, before they have damaged or plundered
 “ every thing they can lay their hands on.”

THE MAIMON has pouches on each side of its cheeks, and callosities on its posteriors ; its tail is naked, curled up, and about the length of five or six inches ; the canine teeth are not much longer in proportion than those of men ; the snout is very broad ; the orbits of the eyes very acute above ; the face, ears, hands, and feet, are naked, and of a flesh colour ; the hair of a dark olive on the body, and of a yellowish colour on the belly : it sometimes walks erect, and at other times upon all fours : it is about two feet, or two feet and an half tall when erect,

THE MACACCO, AND THE EGRET.] Of all the apes, or monkies, with long tails, the macacco approaches nearest the baboon : its body being short and compact, like that animal ; its head thick, its snout broad, its nose flat, its cheeks wrinkled, but it is bulkier and taller than most other monkies. It is also so extremely ugly, that it may well be looked upon as a smaller kind of the baboon, if it did not differ in the tail, which is crooked, but longer and tufted ; whereas, that of the baboon, in general, is extremely short. This species is a native of Congo, and other southern parts of Africa. It is numerous, and subject to many varieties with respect to its size, colour, and disposition of the hair. The body of that described by Hasselquist, was more than two feet long ; and those which we have seen, were not above one foot and an half. That which we here term the

Egret,

Egret, because of the plume on its head, seems to be only a variety of the first, which it perfectly resembles, excepting the difference before mentioned, and some other slight varieties in the hair; both of them are tractable and docile; but, independent of the scent which they diffuse around them, they are so mishapen, and even so hideous when they grimace, that we cannot look on them without horror and disgust. These monkies go in flocks. Basman relates, that they take a melon in each hand, under their arms, and one in their mouths, which they go off with; if the pursuit is hot, they drop first that from under their arm, then that from their hand; and if it be continued, they at last let fall that which they had hitherto kept in their mouths. In other respects, says this traveller, they examine the melon beds carefully, and what does not please them they throw away, and tear up others; so that, by this nicety, they do exceedingly great injuries to many of the orchards and vineyards by their depredations.

THE PATAS, is a native of the same country, and is nearly of the same size as the macacco, the body being only somewhat longer, the face not so ugly, and the hair fairer. It is, indeed, of so brilliant a red, that the animal looks as if it were painted. I am inclined to think, that the monkey spoken of by Marmot, and said to be of the colour of the wild cat, and to be a native of Africa, is only a variety in the patas species. These animals are not so subtle as others of their kind, but are possessed of an extreme curiosity. “I have seen them (says Bruce) descend from the top to the branches of very high trees, to view the vessels on the water, which they admired for some time, and seemed diverted with what they had seen: they quitted their stations for their companions to have the same sight; some even threw the branches of the trees at the French, who returned their salute with a musket ball; some were killed, others wounded, and the rest fell on the ground in the utmost consternation. One part uttered most hideous cries, while another was picking up stones to throw at their enemies, and a third were occupied in the easing of nature into their hands, which presently they sent with vengeance to the spectators; but perceiving at length, how unequal the battle was, they desisted, and prudently retired.”

THE MALBROUCK, AND THE CHINESE BONNET.] These two monkies, or apes, with a long tail, seem to belong

long to one species; and this species, although somewhat different from that of the macacco, is, nevertheless, so far bordering on it, as to give us reason to suppose the macacco, egret, malbrouck, and the bonet chinois, to be only four varieties.

These animals are found in Bengal, where travellers inform us, they plunder whole fields of grain, and plantations of sugar canes; and while one stands centinel on a tree, the others load themselves with the booty. But if the owner of the field, or plantations, appears to interrupt their depredations, their faithful companion on the look-out, gives notice by crying out *houp, houp, houp*, which the rest perfectly understand, and all at once throwing down their plunder, which they hold in their left hands, they scamper off upon three legs, holding the remainder in their right, and save themselves from their pursuers by climbing up trees, where they have their general abode. The females, even loaded with their young ones, clasp them close to their breast, leap like the others from branch to branch, and escape with the rest. When it happens they cannot find any provision in the fields, they get on the tops of houses, and having pulled off the tiles, do great damage to the inside. They do not eat a single thing without smelling at it for a long time before hand, and when they have satisfied their hunger, they put the remainder in the pouches on the sides of their cheeks for the next day; they destroy the nests of birds, and never fail to throw the eggs on the ground when they want appetite or inclination to eat them.

The most formidable enemy these animals have, is the serpent, no other animal of the forest being able to surprize them, as they are so exceedingly swift and subtle, and easily climb up and seat themselves on the tops of the highest trees. The monkey, says a traveller, "has it in his power to be
" master of the forest, for there are neither tygers nor lyons
" which can dispute the possession with it: the chief animal
" it has to fear, and which attack them both night and
" day is the snake. There are some snakes in those forests
" of a prodigious size, which wind up the trees where
" the monkies reside, and when they happen to surprize
" them sleeping, swallow them whole before the little ani-
" mals have time to make a defence."

The malbrouck has pouches on each side of its cheeks, and callosities on its posteriors; its tail is very near as long as the body and head put together. The eyelids are of a fleshy, and the face of an ash colour: the ears are large,
thin

thin, and of a flesh colour : they have a list of grey hairs on them like the mona ; but in other parts are of an uniform colour, approaching towards a brown on the upper parts of the body, and towards a grey on the lower. It goes on all fours, and is about a foot or a foot and an half long from the snout to the insertion of the tail.

The chinese bonnet seems to be a variety of the malbrouck ; it differs from it in the hair on the crown of its head, which is disposed in the shape of a cap or flat bonnet, and in its tail, which is large.

THE MANGABEY.] We have seen two of this kind of monkey ; both were sent to us by the denomination of *Madagascar monkeys*. They are easily distinguished by a very apparent character. The mangabey, has its eyelids naked, and of a striking whiteness. It has pouches on each side of its cheeks, and callosities on its posteriors. Its tail is as long as the head and body put together, and it has a prominent roll of hair over its eyes. Its snout is thick and long, its eyebrows rough and bristly ; its ears black and almost naked : the hair of the upper parts of its body brown, and those below grey. There is a variety in this species, some being of an uniform colour, and the others having a circle of white hair round the neck, and the form of a beard round their jaws. They walk on all fours, and are near a foot and an half long from the snout to the tail.

THE MONA, OR VARIED MONKEY, is the most common of the monkey tribe. We kept one of them alive for many years. This alone is sufficient to prove it is not a native of the hot countries of Africa and India. In fact, it is met with in Barbary, Arabia, Persia, &c. The visage of this animal is of a brown hue, with a kind of white beard, mixt with yellow and a little black ; the back is red and black ; the belly and the hind parts of the thighs and legs whitish, though the fore parts of the two last are of a black colour : the tail is of an ash colour, marked with two white spots, one on each side, at its insertion. On its forehead the hair is of a grey colour, in the form of a crescent, and between the eyes and the ears is a black stripe, as there is from the ears to the shoulders and arms.

In general the disposition of the monkey is much more tractable than the baboon, and not so sullen as the ape : it is extravagantly spirited, but not ferocious, being docile through fear. The mona is in particular susceptible of education, and even attached to those persons who take care of it.

it. That which we brought up, would suffer itself to be stroaked and handled by those it knew, but would often bite strangers. It was chained, but was very desirous of its liberty; for, when it either broke its chain, or got loose, it would run away, and would not suffer itself to be re-taken by any other person than its master. It eat every thing that was offered to it, especially flesh, bread, and its favourite food, fruits. The mona is about a foot and a half in length.

To the animals which we have just described, may be added,

THE CALLITRIX, OR GREEN MONKEY, which is of a beautiful green colour, with a black face. He is found in Mauritania, Senegal, Cape de Verd, &c. and is about 15 inches in length.

THE MUSTACHE, OR WHITE NOSE. It has always two tufts of yellow under the ears, which give it a singular appearance. Its body is a greenish ash colour; it is not above 13 inches in length, and is a native of Guinea.

THE TALAPOIN, which is a native of India. Its colour is a mixture of dusky green and yellow; and it is about 17 inches in length.

THE DOUC, which has a long tail, but is distinguished from all the monkeys of the Old World by having hair on its buttocks. His colour is varied. Round his neck there is a purple collar; a white beard surrounds his cheeks; his face and ears are red; the top of his head and body, grey; the breast and belly, yellow. He is about 4 feet long.

OF THE MONKEY TRIBE IN AMERICA.] All the four-handed animals which we have given a description of, and which we have comprehended under the generical names of Apes, Baboons, and Monkeys, exclusively belong to the Old Continent; and all those which remain to be spoken of, are, on the contrary, only found in the New World. We here distinguish them by two generical names, as we can divide them into two classes; the first into that of the **SAPAJOU**, and the second into the **SAGOIN**. Both these animals have their feet nearly like those of the ape and monkey kind, but they differ from the ape in having tails. The sapajou has a very long tail, which it makes use of to seize and lay hold



Le Bonnet
Chinois

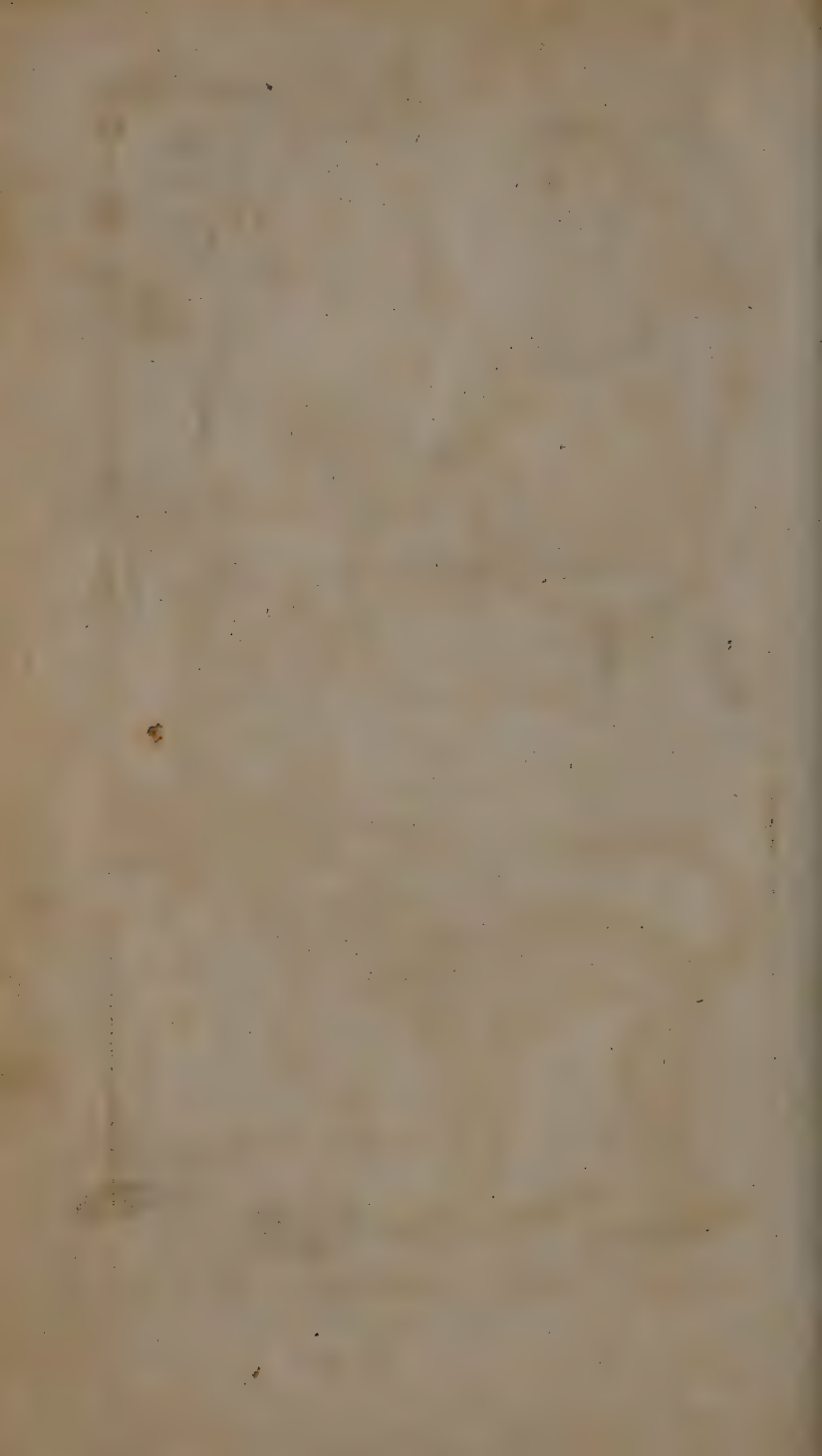
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The Malbrouck p. 315

The Douc p. 318



The Mangabey p. 317



hold of things, and by which it suspends itself from the branches of trees. The tail of the sagoïn, on the contrary, is proportionably longer than that of the sapajou, but is weak and strait, so that they cannot make use of it either to lay hold of any thing, or for the purpose of climbing: this difference is so very apparent, that it is alone sufficient to distinguish the sapajou from the sagoïn.

THE WARINE AND THE ALOUATTO are the largest of these animals belonging to the New Continent: they surpass the size of the largest monkey, and approach the size of the baboon: they have a long tail, and are, moreover, of the sapajou family, in which they hold a very distinct rank, not only with regard to size, but also to voice, which sounds like a drum, and may be heard at a very great distance. "Maregrave informs us, that every morning and evening the *warines* and the *alouattos* assemble in the woods; that one among them seats himself on an elevated place, makes a sign with his hand to the rest to seat themselves round him: as soon as he sees them all seated, he begins an oration with so quick and loud a voice, that, at a distance, it might be imagined they were all making a noise together. During the whole discourse the rest keep a profound silence, and when it is ended, he makes signal to the rest to answer him, and immediately they all set up a cry together, till by another sign with his hand, he orders them to be silent: when they are immediately obedient and quiet. Then the first renews his discourse, or his song, which, when finished, and the others have paid the utmost attention to it, the whole assembly breaks up and separates." "According to the same author, the face of the *warine* is broad, the eyes black and sparkling, the ears short and round, the tail naked at the extremity, with which it holds firmly whatever it encircles: the hair of the body is black, long, and glossy; it is much longer under the chin, which forms a kind of round beard: the hair on the hands, feet, and a part of the tail, is brown. The male is of the same colour as the female, and only differs from it in being a little larger. The females carry their young on their backs, and thus loaded, leap from branch to branch, and from tree to tree. The young one clasps the narrowest part of the body of the mother with its hands and arms, and thus holds itself firmly fastened, whatever motion its parent takes. In other respects, these animals are wild and mischievous;

“ they can neither be tamed nor subdued, and bite dread-
 “ fully. As they live only on fruit, grain, and some in-
 “ sects, their flesh is not bad eating. It is like that of the
 “ hare, but a little sweetish, for which reason a good quan-
 “ tity of salt is put to that part which is roasted: the fat is
 “ yellow, like that of the capon, and of a very fine flavour.
 “ They easily fasten upon the branches of trees, and stick
 “ either by their hands, feet, or tail, wherever they touch,
 “ which renders it very difficult to take them, even after
 “ they are shot, for if they are only wounded, they will not
 “ fall to the ground, but cling to some branch, and remain
 “ on the tree where they were shot, till they drop off by
 “ putrefaction. What appears singular is, that the mo-
 “ ment one of them is wounded, the rest assemble round,
 “ and clap their fingers into the wound, as if they were
 “ desirous of sounding its depth. If the blood then flows
 “ in any quantity, they keep it shut up, while others get
 “ leaves, which they chew, and thrust into the orifice. The
 “ females only bring forth one at a time.”

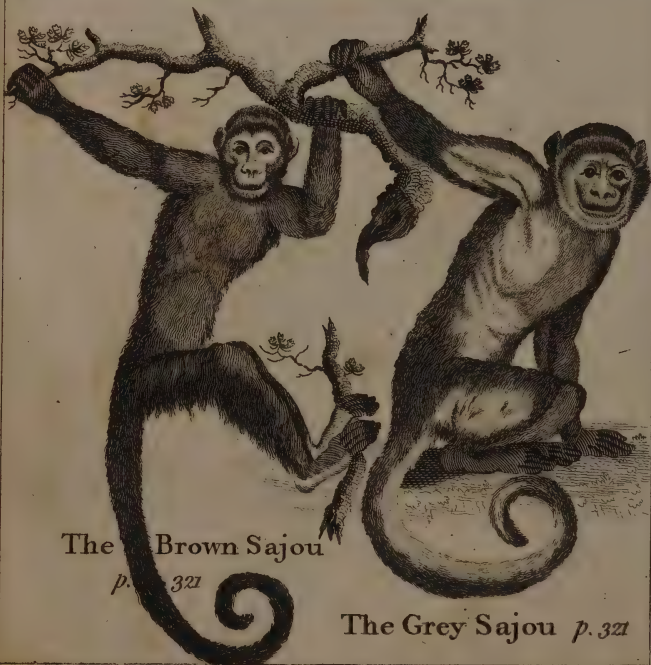
The alouatto has the same characters as the warine, and only seems to differ from it in having no beard, and a reddish-coloured hair, whereas, that of the warine is black.

THE COAITA AND THE EXQUIMA.] Next to the warine and the alouatto, the coaita is the largest of the sapa-jous. I have seen one alive at the Duke of Bouillon's, where, by its familiarity and forward caresses, it merited the affection of those who had it under their care; but in spite of the good treatment and attention paid to it, it could not resist the winter of 1764. It differs greatly in disposition from the warine and the alouatto, which are wild and untameable. It also differs from them in having but four fingers and no thumb to the fore paws: by this character alone, and its holding tail, it is easily distinguished from the monkey kind.

The animal which Marcgrave calls *Exquima*, is of nearly the same species with the *coaita*, and, perhaps, is only a variety of it. I have learnt, by the testimonies of travellers, that there are both black and white coaitas, the one beardless, and the others with a beard. “ There is (says Dam-
 “ pier) in the Isthmus of America, great numbers of mon-
 “ kies, some of which are white, but the most part black—
 “ some have beards, others none. These monkeys are very
 “ droll, and performed a thousand grotesque postures as we
 “ traversed the woods. When they are unable to leap from



The Callitrix p. 318



The Brown Sajou

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The Grey Sajou p. 321

“ one tree to another, on account of the distance, or the
 “ tree being separated by a river, their dexterity is very sur-
 “ prizing. The whole family form a kind of chain, lock-
 “ ing tail in tail, or hand in hand, and one of them hold-
 “ ing the branch above, the rest swing down, balancing to
 “ and fro like a pendulum, until the undermost is enabled
 “ to catch hold of the lower branches of some neighbour-
 “ ing tree. When the hold is fixed below, the monkey lets
 “ go that which was above, and thus comes undermost in
 “ turn; but, creeping up along the chain, attains the next
 “ branches, like the rest; and thus, they all take possession
 “ of the tree without ever coming to the ground.”

They have the address to break the shell of the oysters to eat them. They generally produce only one or two young ones at a time, which they carry upon their backs: they feed upon fish, worms, and insects, but fruit is their general food, and they grow fat when it is ripe, when, it is said, their flesh is good and exquisite eating.

The coaita is about a foot and an half long, and its tail is longer than the head and body measured together: it goes on all fours.

The exquima is nearly of the same size as the coaita: it has not, however, its hair of a black colour over all the body, but it varies in its colour; there are some black and brown on the back, and white on the belly, with a very remarkable beard.

THE SAJOU, OR CAPUCHIN MONKEY.] We are acquainted with two varieties in this species; the brown sajou, commonly called the *Capuchin Monkey*; and the grey sajou, which only differs from the other in the colour of its hair; they are both lively, active, and very pleasing by their tricks and nimbleness. They are, however, fantastical in their tastes and affections: they seem to have a strong inclination for some people, and as great an aversion for others.

THE SAI, OR WEEPER.] We have seen two of these animals, which seem to make a variety in the species. The hair of the first is of a deep brown; the hair of the second, which we have called the *White-throated Sai*, is white on the breast, neck, ears, and jaws. Travellers have described these animals by the name of *Howlers*, from their plaintive moan. Others have called them *Musk Monkeys*, from their having, like the macacco, that peculiar smell. They belong to the sapajou family, as they have a holding tail: they have
 Y only

only two teats, and bring forth but one or two at a time. They are gentle, docile, and so timorous, that their common cry, which resembles that of the cat, is dwindled down to a kind of sighing when they are threatened. Their food, in this climate, is principally snails and beetles, which they prefer before any other; but in their native country of Brasil, they chiefly live upon grain, and the wild fruit they pluck from trees, whence they very seldom descend, till they have stripped their habitation of its treasure.

THE SAIMIRI is vulgarly known by the name of the *Golden, Orange-coloured, or Yellow Sapajou*. It is common in Guiana. By its air, size, the brilliant colour of its coat, fulness and brightness of its eyes, and its small, round visage, the saimiri has ever taken the lead of every other sapajou: it is, in fact, the most beautiful and delicate of the kind, and the most difficult to transport and preserve in other countries. Its tail, without being absolutely useless and weak, like that of the sagoin, is also not so muscular as that of the sapajou: its tail may be said to be but half-holding; and though it makes use of it to climb up trees, yet it can neither strongly hold, nor firmly fix itself with it. It is scarcely more than ten or eleven inches in length. It sits upright on its hinder feet with great ease; but it walks commonly on all fours.

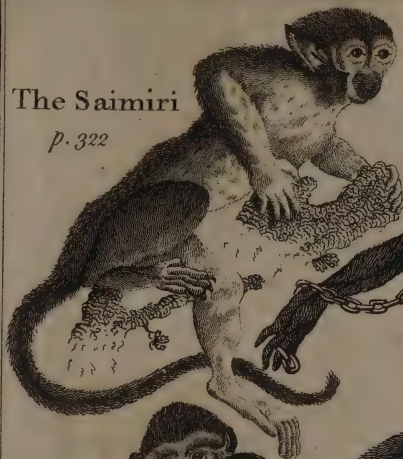
THE SAKI, commonly called the *Fox-tailed Monkey*, from its tail being clothed with very long hair, is the largest of the sagoin kind, being about seventeen inches long; whereas, the size of the five other sagoins is not above nine or ten. The saki has very long hair on its body, and still longer on its tail. Its face is red, and covered with a whitish down.

THE TAMARIN, OR GREAT-EARED MONKEY, is much smaller than those we have just described (being about seven or eight inches in length), and differs from them in many characters, particularly in the tail, which is clothed only with short hair; whereas, that of the saki is furnished with very long. The body, head and tail, are covered with dark brown, bristly hair; and it is remarkable for the largeness of its ears, and its yellow feet. It is a pretty and lively animal, very easily tamed, but so exceedingly delicate as not to be able long to resist our climate.

THE WISTITI, OR STRIATED MONKEY.]- The name of this animal is taken from the sound of its voice. It is smaller

The Saimiri

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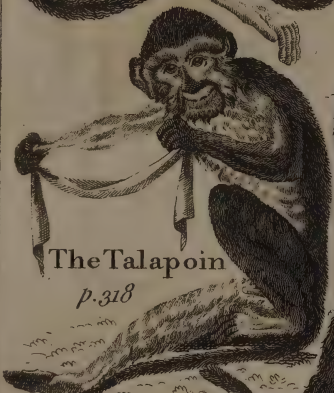


The White Throated
Sai p. 321



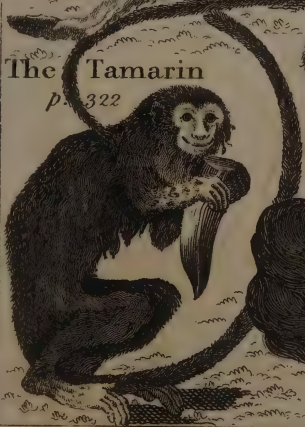
The Talapoin

p. 318



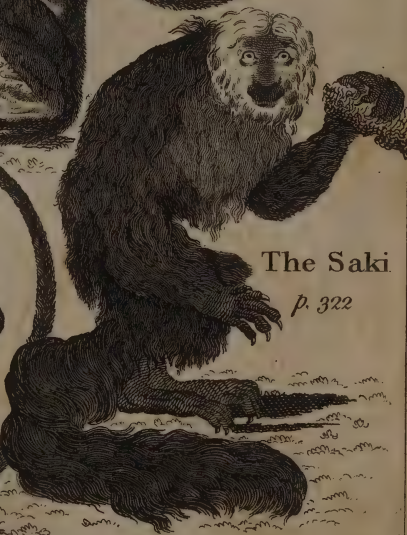
The Tamarin

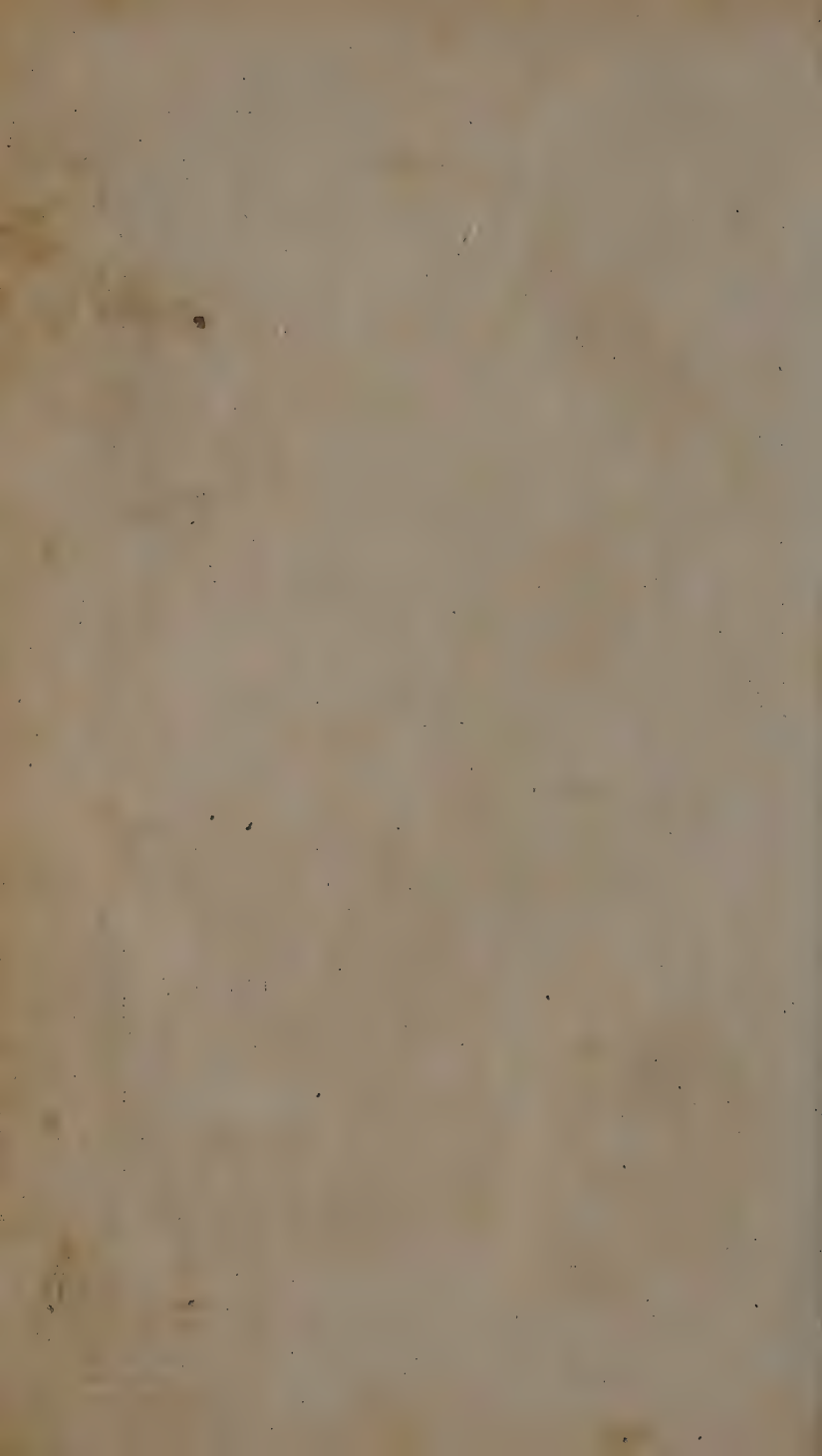
p. 322



The Saki

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smaller than the tamarin, being not above six inches long, and its tail more than double that length, which is annulated black and white, like the macacco's. Its face is naked, and of a flesh colour. It has two very singular tufts of long white hair on the fore part of the ears, which, although very large, cannot be seen by looking at the full face of this animal. Mr. Edwards says, that, when it is in good health, it has much hair and tufted; that one of those which he saw, and which was healthy, fed on several things, as biscuits, fruit, pulse, insects, snails; and, being one day unchained, he struck at a little gold-fish which was in a glass globe, killed it, and devoured it with the greatest avidity; that afterwards, some small eels being put before him, he was frightened when they twisted about his neck, but that he soon conquered and eat them. These animals, when young, have an ugly appearance, having scarcely any hair on their bodies. They cling closely to the teats of their dam; and as they grow older, they fix themselves on her back or shoulders; when she is weary of carrying them, she releases herself by rubbing against the wall.

THE MARIKINA is sufficiently known by the vulgar name of the Small Lion Monkey. It is about eight inches long, and has a small tuft of hair at the end of the tail; its hair is tufted, long, soft, and glossy; the head is round; the face is brown; the eyes red; the ears round, naked, and concealed under the long hair which encompasses the face. This hair is of a bright red; that on the body and tail, of a very pale yellow, approaching towards white. This animal has the same manners, the same vivacity, and the same inclination as other sagoins, and seems to be of a more robust temperament. We have seen one which lived five or six years at Paris, by the care alone of keeping it, during the winter, in a chamber, wherein a fire was kept every day.

THE PINCH is about nine inches long; and its tail is as long again. It is remarkable for a kind of white and striped hair on the top and sides of the head; its face is black, shaded by a small grey down; its eyes are black, its tail of a bright red at its insertion, and even as far as half its length, where it changes to a deep brown. The hair of the upper parts of the body is of a brown colour; that of the breast, belly, hands, and feet, is white; the skin is black, even where covered with white hair; its throat is naked, and

black, like its face; its voice is soft, and resembles more the pipe of a little bird, than the cry of an animal; it is very delicate, and cannot be transported from America into Europe, without the greatest precaution.

THE MICO.] We owe the knowledge of this animal to M. de la Condamine, and shall therefore give this author's account of it, in his Voyage up the Amazonian River. "The Mico which the Governor of Para made me a present of, was the only one of its kind that had been seen in the country. The hair of its body was of the most beautiful silver colour, and its tail of a glossy nature, approaching towards a black. It had another more remarkable singularity; its ears, jaws, and snout, were tinged with so bright a vermilion, as scarcely to be thought natural. I have had it a year; and it was alive at the time I was writing this account, almost within sight of the French coast, where I hoped to have brought it alive; but, notwithstanding the continual precautions that I took to preserve it from the cold, yet the rigour of the season probably killed it."

C H A P. XXII.

The Tartarian Cow.—The Totai.—The Zisel.—The Zemni.—The Pouch.—The Perouasca.—The Souflik.—The Golden-coloured Mole.—The White Water Rat.—The Guinea Hog.—The Wild Boar of Cape Verd.—The Mexican Wolf.—The Alco.—The Tayra.—The Philander of Surinam.—The Akouchi.—The Tucan.—The Brasilian Field Mouse.—The Aperea.—The Tapeti.—A View of the Animals petuliar to each Continent.

THE TARTARIAN COW.] MR. Gmelin, in the new Memoirs of the Royal Academy at Peterbourg, has given the description of this animal, which seems, at first sight, to be a quite different species from all those we have spoken of under the article of buffalo. "This cow," says he, "which I saw alive, and had painted in Siberia, came from Calmuchia, and was about the length of two Russian ells and an half; by which model we may judge of the other dimensions, which the designer has well executed the proportion of. The body resembles that of the common cow; the hair

" on

“ on the body is black, excepting on the forehead and spine
 “ of the back, where it is of a white colour. The neck is
 “ covered with a mane, and all the rest of the body with a
 “ very long hair, which descends to the knees, so that the
 “ feet appear very short; the back is raised in the form of
 “ a hunch; the tail resembles that of a horse, white, and
 “ well clothed with hair; the fore feet are black, and the
 “ hinder ones white; there are two tufts of long hair, one
 “ before, and the other behind. The excrements are of a
 “ more solid nature than those of the common cow; and it
 “ grunts like a hog. It is wild, and even ferocious; for,
 “ excepting the man who feeds it, it butts all those that
 “ come near it with its head; and it dislikes the company
 “ of domestic cows.”

THE TOTAL.] This animal, which is very common in Baikal Lake, in Tartary, is a little larger than a rabbit, which it resembles in shape, quality, smell, and colour of the hair, and also in the habit of burrowing in the earth to conceal themselves. It differs only in the tail, which is considerably longer than that of the rabbit.

THE ZISEL is smaller than the hamster: its body is long and slender, like the weasel; whereas, that of the hamster is thick and compact, like that of the rat. It has no external ears, but only auditory passages concealed under the hair. The zisel is of a greyer, or of a more uniform colour, than the hamster; and the latter is marked in the fore part of its body with three large white spots on each side. Those differences, joined to that of their not mixing together, though natives of the same country, are sufficient to leave us not the least room to doubt of their being two different species.

THE ZEMNI.] There is another animal in Poland and Russia, which is called *ziemni*, or *zemni*, of the same race as the *zisel*, but larger, stronger, and more mischievous. It is somewhat smaller than the domestic cat; its head is large, its body slender, and its ears short and round. These have four great incisive teeth: the two in the lower jaw are thrice as long as the two in the upper. The feet are very short and hairy, divided into five toes, and armed with crooked claws; the hair is soft, short, and of a mouse colour; the tail moderately large; its eyes small and hid, like those of the mole. Its disposition and habitudes are nearly the

same as those of the hamster and zifel; its bite is dangerous; it eats greedily, and plunders orchards and gardens; it burrows; and lives upon grain, fruit and pulse, which it stores in magazines for its winter support.

THE POUCH is larger than the domestic rat; its snout is long; it burrows, and commits depredations in the gardens, &c. There are such numbers near Suraz and Volhinia, that the inhabitants were obliged to abandon the culture of their gardens.

THE PEROUASCA.] There is also in Russia and Poland, especially in Volhinia, an animal which the Russians call *Perewiaska*, and the Polanders *Pizewiaska*; a name we may translate the *cinclured weasel*. This animal is not so large as a pole-cat, covered with a whitish hair, transversally striped of a reddish colour, which appear as so many girdles. It lives in the woods, and burrows in the earth; its skin is sought after, and makes a very beautiful fur.

THE SOUSLIK.] There is found at Casan, and in the provinces which the Volga pervades, a small animal, called *Souslik* in the Russian tongue, of which very beautiful furs are made. Its tail is short, like the field-mouse; but what distinguishes it from that and every other rat, is its coat, which is of a greyish hue, sprinkled with small spots of a glossy and bright white colour: these little spots are exceedingly small, at a small distance from each other; they are more apparent upon the loins of this animal, than on the shoulders and head. "The rats called *Sousliks*," says M. Sanchez, "are taken in great numbers on the salt vessels in the river *Kama*, which descend from *Salikam-skia*, where the salt-pits are, and falls into the Volga below Casan. The Volga, from *Simbuski* to *Somtoff*, is covered with these salt vessels; and these animals are taken on those vessels, and the borders of those rivers: their name is *souslik*, i. e. *dainty-mouthed*, because they are very fond of salt."

THE GOLDEN-COLOURED MOLE.] Not to omit any animals that belong to the North, we shall take notice of a kind of mole found in Siberia, called the *Golden-coloured Mole*, the species of which may be different from the ordinary mole, because the Siberian has no tail, and a short snout; the hair red and green; only three toes to the fore feet,

feet, and four to the hinder; whereas, the common mole has five toes on every foot.

THE WHITE WATER RAT.] The European water rat is again seen in Canada, but its colour is different: its back is only brown; the rest of the body is white and brown; the head and snout are white, as is the extremity of the tail; the hair seems softer and more glossy than that of our water rat; but they are alike in every other respect; so that we cannot doubt but that these two animals are of the same species; the whiteness of their hair being produced by the coldness of the climate.

THE GUINEA HOG is nearly of the same figure as our hog, and about the same size as the Siam hog; that is to say, smaller than our boar, or our hog. It is a native of Guinea, and has been transported into Brasil, where it has multiplied, as in its native country; it is domestic and tame; its hair is short, red and glossy; it has no bristles, not even on the back; the tail only, and the crupper near the tail, are covered with longer hair than the rest of the body: its head is not so large as that of our hog; and its ears are very long, and turned backwards over its neck; its tail is as much longer, almost touching the ground; and it has no hair towards its extremity.

THE WILD BOAR OF CAPE VERD.] There is another hog, or wild boar, at Cape Verd, which, by the number of its teeth, and enormous size of its two tusks of the upper jaw, seems to be of a different breed, and, perhaps, of a different species, from every other hog, and approaches nearer the Babiroussa. These tusks resemble ivory horns, rather than teeth; they are half a foot long, and five inches round at the base, and are crooked nearly like the horns of a bull.

THE MEXICAN WOLF has the same figure, the same appetites, and the same habitudes, as the European or North American wolf; and every thing seems to prove them to be of one and the same species: its head, however, is larger, its neck thicker, and the tail not so hairy; above the mouth, there are some thick bristles, but not so rough as those of the hedge-hog; the body is covered with greyish hair, marked with some white spots; the head, which is of the same colour as the body, is crossed with brown stripes; and the forehead is adorned with fallow-coloured spots; the ears are

of a grey colour, like the head and body. There is a long spot, of a fallow colour, on the neck; a second spot, like the first, on the breast; and a third on the belly. The flank is marked with transversal lists, from the back to the belly. The tail is grey, and marked with a fallow spot on the middle; the legs are striped, from top to bottom, of a grey and brown colour. This wolf, as we observe, is the most beautiful of the kind; and its fur is greatly valued.

THE ALCO, OR MEXICAN DOG.] Besides the dogs, says Fernandez, which the Spaniards have transported into America, we met with three other species there, which resemble ours, both in nature and manners, and which do not greatly differ from it in form. The first, and the longest of these American dogs, is that called *Xoloigtcuintli*. What is particularly remarkable in these animals, is, their being without hair, and only covered with a soft, close skin, marked with yellow and blue spots. The second is clothed with hair, and, with respect to its size, sufficiently resembles our little Malta dogs. It is marked with white, black and yellow; it is singular and agreeable by its deformity, having a hunched back, and an exceeding short snout; so that the head seems to shoot immediately out of the shoulders; it is called *Micuacanens*, from the name of its country. The third kind of these dogs, called *Techichi*, sufficiently resembles our little dogs; but its look is dull and savage. The Americans eat their flesh. The word *Alco* appears to be a generical term.

THE TAYRA, OR GALERA, is about the size of a small rabbit, and resembles the weasel or the ferret. It burrows like those animals, and has its fore feet very strong, and considerably shorter than the hinder ones. Its snout is elongated, a little pointed, and adorned with a whisker. The body is oblong, and greatly resembles that of a rat; it is covered with brown hair, some of which is pretty long, and others much shorter. This animal resembles the species of ferret, or pole-cat. Linnæus, with some reason, supposes, that the black weasel of Brasil is also found in Guiana, where it is called *Tayra*.

THE PHILANDER OF SURINAM.] This animal belongs to the same climate, and is of a near species to the sariga, marmose, cayopalin and phalanger. It has very sparkling eyes, surrounded with a circle of deep brown hair. The body

The Coaita

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The Marikina

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The Pinch

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The Adult Ai p. 174

The Mouftac





body is covered with a soft hair, or rather a kind of wool, of a reddish colour, which is fair on the back, and of a yellowish colour on the snout, forehead, belly and feet. The feet resemble the hands of the ape; the fore feet having four fingers and a thumb, with short and obtuse nails; whereas, only the thumb or great toe of the hinder feet is flat and obtuse, the rest being armed with small, sharp claws. The young of these animals grunt somewhat like a pig: they get on the back of their dam, and fix themselves there, by fastening their tails to her's. In this situation, which is familiar to them, they are carried with as much safety as swiftness.

THE AKOUCHI is common in Guiana, and other parts of South America. It differs from the agouti by having a tail. The akouchi is generally smaller than the agouti; but its hair is not red, but olive.

THE TUCAN, OR MEXICAN SHREW, is a little larger than our mole, and, like that, is fat and fleshy, with such very short legs, that its belly touches the ground. Its tail is short; its ears small and round; its eyes so very small, that they may be said to be useless; but it differs from the mole in the colour of its hair, which is of a reddish hue, and by the number of toes, having only three to the fore feet, and four to those behind. It seems still farther to differ from it, by its flesh being good to eat.

THE FIELD-MOUSE OF BRASIL is considerably larger than ours, being about five inches from the extremity of the snout to the insertion of the tail, which is only two inches, and, consequently, much shorter in proportion than that of the common field-mouse. Its snout is pointed, and its teeth very sharp.

THE APEREA.] This animal, which is found in Brasil, is neither a rabbit nor a rat; yet it seems to partake something of both. It is about a foot long, by seven inches in circumference. The hair is of the same colour as our hares, but white upon the belly. It has also, like that animal, a slit lip, large incisive teeth, and a whisker about the mouth; but its ears are rounded, like those of a rat; the fore legs are only three inches high; those behind are longer. The apera has no tail; its head is a little longer than that of the hare, and its flesh is like that of a rabbit, which it resembles
in

in its method of living: it conceals itself in holes, but does not burrow like a rabbit, but rather retires into the cavities of the rocks and stones. It is very easily taken.

THE TAPETI seems to me to be a very near species, and perhaps a variety of that of the rabbit or hare. It is found at Brasil, and other parts of America. It resembles the European rabbit in figure, and the hare in size and colour; its ears are very long, and of the same shape; its hair is red on the forehead, and whitish on the throat; some have a circle of hair round their neck; they are all white on the throat, breast and belly; they have black eyes, and whiskers like the rabbit, but have no tail. The tapeti resembles the hare in its method of living, fecundity, and quality of its flesh, which is excellent food. It lives in the fields, or woods, like the hare, and does not burrow like the rabbit.

After so copious a history of quadrupeds as that which has just been submitted to our readers, a very few words appear necessary to complete the natural history of that class of animals.

The number of distinct species of quadrupeds, according to Buffon and Dr. Goldsmith, amounts to about two hundred.—Later authors have enumerated two hundred and eighty.

As the subjects of the history were few, a distinct and accurate classification appeared unnecessary; and we have therefore pursued the order of M. De Buffon, who regarded this scholastic method of treating natural history, as liable to great objections, and, in this instance, as more likely to produce confusion and mistake in the mind of the student, than to assist the memory.

On one topic only we shall a little enlarge.—It has been frequently intimated, that a material difference exists between the animals of the Old and the New continent. While America far exceeds us in the size of its reptiles, it is far inferior in its quadruped productions. In effect, so materially different are many of them found which inhabit the New continent, from those of the Old, that, though we have generally noted the country of the animal we have described, yet we conceived, that it might not be unsatisfactory to the reader, if we endeavoured to exhibit a synopsis of the quadrupeds which are peculiar to each continent.—In pursuing this plan, we have made two columns; the one for Europe, Asia and Africa; the other for America. When we have found an animal of the New continent resembling nearly that of the Old, we have placed it opposite in the same line; and those which are common to both, we have placed in the middle, between the two columns.

Europe,

Europe, Asia and Africa.

America.

[illegible]

Badger

Europe, Asia and Africa.

America.

Badger

Sable

Ermine

Jerboa

Maki

Several species of Monkeys

Pangolin and Phatagin

Rein Deer

Sapajou and Sagoin

Racoon

Cabiai

Tajacou

Ant-Eaters

Sloth

Cariacou

Couandou

Agouti

Coati

Opoffum

Pacos

Indian Hog

Cavy

Armadillo

Ternat Bat

Stag

Bear

Roebuck

Hare

Squirrel

Hedge-hog

Otter

Marmot

Shrew Mouse

Mole

Beaver

Wolf

Fox

Weasel

Ermine

Pine Weasel

Pole Cat

Lynx

Seal

Roebuck

Elk

Mexican Shrew

Mexican Wolf

Tayra

Pouch

Defman

Ondatra.

Of the 200 species of quadrupeds which Buffon supposes to exist, he calculates, that about 90 are original inhabitants of the Old continent, and about 70 of the New, and that 40 may be accounted common to both.

C H A P. XXIII.

Of Birds in general.—Of the Ostrich.—The Emu.—The Cassowary.—The Dodo.—Of rapacious Birds.—The Eagle.—The Condor.—The Vulture.—The Falcon and other Hawks.—The Butcher-bird.—The different species of Owls.

QUADRUPEDS in their general structure have much relation with that of man; but the structure of birds is in most respects entirely dissimilar from both. One obvious mark of distinction between this class of animals and the quadruped part of the creation is, that instead of hair, birds are covered with feathers, and these appear to be nourished and kept in order in a different manner from the hair of animals. Lest the feathers should spoil by exposure to the air, the bird is furnished with a gland situated on the rump of the animal, containing a proper quantity of oil, which it presses out with its beak, and occasionally anoints its feathers. In water fowl this oil is so plentiful that it even imparts a degree of rancidity to the flesh, and we see that their coat of feathers is rendered by it completely water-proof.

The wings of birds are remarkably strong. The flap of a swan's wing would break a man's leg, and a similar blow from an eagle has been known to lay a man dead in an instant.

The sense of seeing in birds is remarkably acute, and though they have no external ear, but only two small orifices or ear-holes, yet they do not appear to be deficient in hearing. The scent of some species is exquisitely delicate. In decoys where ducks are caught, the men who attend them generally keep a piece of turf lighted, on which they breathe, lest the fowl should smell them and fly away. The voice of birds is much louder in proportion to their size than that of other animals, for in fact, the bellowing of an ox is not louder than the scream of a peacock.

The legs, the wings, the bones, and every part of the body, are much lighter, firmer, and more compact in birds than in other creatures. Their lungs are extended all over the cavity of their body.

Carnivorous birds, like carnivorous quadrupeds, have but one stomach, and that well calculated for digestion. Those that feed on grain have in addition to the crop or stomach, where

where their food is moistened and swelled, a gizzard, which is a very hard muscle, almost cartilaginous, and which they commonly fill with small stones, where the food is afterwards ground, in order to its complete digestion. Birds are subject to few diseases.

Birds of the same species do not always make their nests of the same materials, though in general there is a uniformity; the red-breast in some parts of England makes its nest with oak leaves where those leaves are plenty, in other parts it makes it with moss and hair. Where the eggs are numerous it is necessary to make the nest warm; thus the wren, which is a small animal, and able to cover but a small compass, and yet lays many eggs, makes her nest remarkably warm; on the contrary the plover, the eagle, the crow, &c. which lay but two or three, are not equally solicitous in this respect.

There are some birds which are called birds of passage, and which by migrating make an habitation in all parts of the earth; but in general every climate has birds peculiar to itself. In all countries birds are much longer lived than quadrupeds. The swan is said to live near three hundred years. They are however greatly inferior to quadrupeds in sense and docility.

As the number of species in this order of animals is very numerous, amounting to above eight hundred, some degree of classification appears to be absolutely necessary. We shall therefore adopt the six classes of Linnæus, without pursuing his order in too servile a manner; and shall describe at least the principal birds in each class. After a short account of the large birds the ostrich, the emu, the cassowary and the dodo, we shall consequently in the first place proceed to the birds of the rapacious class.

THE OSTRICH is the largest of all birds. The head and bill somewhat resemble those of a duck; and the neck may be likened to that of a swan, but that it is much longer; the legs and thighs resemble those of an hen; though the whole appearance at a distance bears a strong resemblance to that of a camel, it is usually seven feet high from the top of the head to the ground; but from the back it is only four; so that the head and neck are above three feet long. From the top of the head to the rump, when the neck is stretched out in a right line, it is six feet long, and the tail is about a foot more. One of the wings, without the feathers, is a foot and an half; and being stretched out, with the feathers, is three feet.

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The plumage is much alike in all ; that is, generally black and white ; though some of them are said to be grey. The greatest feathers are at the extremities of the wings and tail, and the largest are generally white. The next row is black and white ; and of the small feathers, on the back and belly, some are white and others black. There are no feathers on the sides, nor yet on the thighs, nor under the wings. The lower part of the neck, about half way, is covered with still smaller feathers than those on the belly and back ; and those, like the former, also are of different colours. The head and upper part of the neck are covered with hair.

At the end of each wing, there is a kind of spur almost like the quill of a porcupine. It is an inch long, being hollow and of an horny substance. There are two of these on each wing ; the largest of which is at the extremity of the bone of the wing, and the other a foot lower. The neck seems to be more slender in proportion to that of other birds, from its not being furnished with feathers.

The thighs are very fleshy and large, being covered with a white skin, inclining to redness, and wrinkled in the manner of a net, whose meshes will admit the end of a finger. Some have very small feathers here and there on the thighs ; and others again have neither feathers nor wrinkles. The legs are covered before with large scales. The end of the foot is cloven, and has two very large toes, which, like the leg, are covered with scales. These toes are of unequal sizes. The largest, which is on the inside, is seven inches long, including the claw, which is near three-fourths of an inch in length, and almost as broad. The other toe is but four inches long, and is without a claw.

The ostrich is a native only of the torrid regions of Africa. Its flesh is proscribed in Scripture as unfit to be eaten : and most of the ancient writers describe it as well known in their times. Like the race of the elephant, it is transmitted down without mixture ; and has never been known to breed out of that country which first produced it. It inhabits from preference the most solitary and horrid deserts, where there are few vegetables to clothe the surface of the earth, and where the rain never comes to refresh it. The Arabians assert that the ostrich never drinks ; and the place of its habitation seems to confirm the assertion. In these formidable regions, ostriches are seen in large flocks, which to the distant spectator appear like a regiment of cavalry, and have often alarmed a whole caravan. There is no desert, how

barren

barren soever, but is capable of supplying these animals with provision; they eat almost every thing; and these barren tracts are thus doubly grateful, as they afford both food and security. The ostrich is of all animals the most voracious. It will devour leather, grass, hair, iron, stones, or any thing that is given. Nor are its powers of digestion less in such things as are digestible. Those substances which the coats of the stomach cannot soften, pass whole; so that glass, stones, or iron, are excluded in the form in which they were devoured. All metals, indeed, which are swallowed by any animal, lose a part of their weight, and often the extremities of their figure, from the action of the juices of the stomach upon their surface. A quarter pistole, which was swallowed by a duck, lost seven grains of its weight in the gizzard before it was voided; and it is probable that a still greater diminution of weight would happen in the stomach of an ostrich; considered in this light, therefore, this animal may be said to digest iron; but such substances seldom remain long enough in the stomach of any animal to undergo so tedious a dissolution. The ostrich lays very large eggs, some of them being above five inches in diameter, and weighing above fifteen pounds. These eggs have a very hard shell, somewhat resembling those of the crocodile, except that those of the latter are less and rounder.

The season for laying in the northern parts of Africa is about the beginning of July; in the south, it is about the latter end of December. These birds are very prolific, and lay generally from forty to fifty eggs at one clutch. It has been commonly reported that the female deposits them in the sand; and, covering them up, leaves them to be hatched by the heat of the climate, and then permits the young to shift for themselves. Very little of this however is true: no bird has a stronger affection for her young than the ostrich, and none watches her eggs with greater assiduity. It happens, indeed, in those hot climates, that there is less necessity for the continual incubation of the female; and she more frequently leaves her eggs, which are in no fear of being chilled by the weather: but though she sometimes forsakes them by day, she always carefully broods over them by night; nor is it more true that they forsake their young after they are excluded the shell. On the contrary, the young ones are not even able to walk for several days after they are hatched. During this time, the old ones are very assiduous in supplying them with grass, and very careful to defend them from danger: nay, they encounter every danger in their defence.

Exclusive of the value of their plumage, some of the savage nations of Africa, hunt them also for their flesh; which they consider as a dainty. They sometimes also breed these birds tame, to eat the young ones, of which the female is said to be the greatest delicacy; and a single egg is said to be a sufficient entertainment for eight men.

As the spoils of the ostrich are thus valuable, it is not to be wondered at that man has become their most assiduous pursuer. For this purpose, the Arabians train up their best and fleetest horses, and hunt the ostrich still in view. Perhaps, of all varieties of the chase, this, though the most laborious, is yet the most entertaining. As soon as the hunter comes within sight of his prey he puts on his horse with a gentle gallop, so as to keep the ostrich still in sight; yet not so as to terrify him from the plain into the mountains. Of all known animals that make use of their legs in running, the ostrich is by far the swiftest: upon observing himself therefore pursued at a distance, he begins to run at first, but gently; either insensible of his danger, or sure of escaping. In this situation he somewhat resembles a man at full speed; his wings, like two arms, keep working with a motion correspondent to that of his legs; and his speed would very soon snatch him from the view of his pursuers, but, unfortunately for the silly creature, instead of going off in a direct line, he takes his course in circles; while the hunters still make a small course within, relieve each other, meet him at unexpected turns, and keep him thus still employed, still followed for two or three days together. At last, spent with fatigue and famine, and finding all power of escape impossible, he endeavours to hide himself from those enemies he cannot avoid, and covers his head in the sand, or the first thicket he meets. Sometimes, however, he attempts to face his pursuers: and, though in general the most gentle animal in nature, when driven to desperation he defends himself with his beak, his wings and his feet. Such is the force of his motion, that a man would be utterly unable to withstand him in the shock.

OF THE EMU, which many call the American ostrich, but little is certainly known. It is an inhabitant of the New Continent; and the travellers who have mentioned it, seem to have been more solicitous of proving its affinity to the ostrich, than of describing those peculiarities which distinguish it from all others of the feathered creation.

It is chiefly found in Guiana, along the banks of the Oronoko, in the inland provinces of Brasil and Chili, and the vast forests that border on the mouth of the river Plata. Many other parts of South America were known to have them; but as men multiplied, these large and timorous birds either fell beneath their superior power, or fled from their vicinity.

The emu, though not so large as the ostrich, is only second to it in magnitude. It is by much the largest bird in the New Continent; and is generally found to be six feet high, measuring from its head to the ground. Its legs are three feet long; and its thigh is near as thick as that of a man. It is covered from the back and rump with long feathers; these feathers are grey upon the back, and white on the belly. It goes very swiftly, and seems assisted in its motion by a kind of tubercle behind, like an heel, upon which, on plain ground, it treads very securely: in its course it uses a very odd kind of action, lifting up one wing, which it keeps elevated for a time; till letting it drop, it lifts up the other: it runs with such a swiftness, that the fleetest dogs are thrown out in the pursuit. One of them, finding itself surrounded by the hunters, darted among the dogs with such fury that they made way to avoid its rage; and it escaped, by its amazing velocity, in safety to the mountains.

When the young ones are first hatched, they are familiar, and follow the first person they meet. I have been followed myself, says Wafer, by many of these young ostriches; which, at first, are extremely harmless and simple: but as they grow older, they become more cunning and distrustful; and run so swift, that a greyhound can scarcely overtake them. Their flesh, in general, is good to be eaten; especially if they be young. It would be no difficult matter to rear up flocks of these animals tame, particularly as they are naturally so familiar: and they might be found to answer domestic purposes, like the hen, or the turkey. Their maintenance could not be expensive, if, as Narborough says, they live entirely upon grass.

THE CASSOWARY is a bird which was first brought into Europe by the Dutch, from Java, in the East-Indies, in which part of the world it is only to be found.

The cassowary, though not so large as the former, yet appears more bulky to the eye; its body being nearly equal, and its neck and legs much thicker and stronger in proportion;



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this conformation gives it an air of strength and force, which the fierceness and singularity of its countenance conspire to render formidable. It is five feet and an half long, from the point of the bill to the extremity of the claws. The legs are two feet and an half high, from the belly to the end of the claws. The wing is so small, that it does not appear; being hid under the feathers of the back. In other birds, a part of the feathers serve for flight, and are different from those that serve for mere covering; but in the cassowary, all the feathers are of the same kind, and outwardly of the same colour. They are generally double; having two long shafts, growing out of a short one, which is fixed in the skin. The beards that adorn the stem or shaft, are from about half way to the end, very long, and as thick as an horse-hair, without being subdivided into fibres. The stem or shaft is flat, shining, black, and knotted below; and from each knot there proceeds a beard: likewise, the beards at the end of the large feathers are perfectly black; and towards the root of a grey tawny colour; shorter, more soft, and throwing out fine fibres, like down; so that nothing appears except the ends, which are hard and black; because the other part, composed of down, is quite covered. There are feathers on the head and neck; but they are so short, and thinly sown, that the bird's skin appears naked, except towards the hinder part of the head, where they are a little longer. The wings, when they are deprived of their feathers, are but three inches long. The ends of the wings are adorned with five prickles, of different lengths and thickness, which bend like a bow: these are hollow from the roots to the very points, having only that slight substance within, which all quills are known to have. The longest of these prickles is eleven inches; and it is a quarter of an inch in diameter at the root, being thicker there than towards the extremity; the point seems broken off.

The part, however, which most distinguishes this animal is the head; this, though small, like that of an ostrich, does not fail to inspire some degree of terror. It is bare of feathers, and is in a manner armed with an helmet of horny substance, that covers it from the root of the bill to near half the head backwards. This helmet is black before and yellow behind. Its substance is very hard, being formed by the elevation of the bone of the skull; and it consists of several plates, one over another, like the horn of an ox. Some have supposed that this was shed every year with the feathers; but the most probable opinion is, that it only ex-

foliates slowly like the beak. To the peculiar oddity of this natural armour may be added the colour of the eye in this animal, which is a bright yellow, and the globe being above an inch and an half in diameter, give it an air equally fierce and extraordinary. At the bottom of the upper eye-lid, there is a row of small hairs, over which there is another row of black hair, which look pretty much like an eye-brow. The sides of the head, about the eye and ear, being destitute of any covering, are blue, except the middle of the lower eye-lid, which is white. The neck is of a violet colour, inclining to that of slate; and it is red behind in several places, but chiefly in the middle. About the middle of the neck before, at the rise of the large feathers, there are two projections formed by the skin, which resemble somewhat the gills of a cock, but that they are blue as well as red. The skin which covers the fore-part of the breast, on which this bird leans and rests, is hard, callous, and without feathers. The thighs and legs are covered with feathers, and are extremely thick, strong, and straight; but the legs are thicker a little above the foot than in any other place. The toes are covered with scales, and are but three in number; for that which should be behind is wanting.

Thus formed for a life of hostility, for terrifying others, and for its own defence, it might be expected that the cassowary was one of the most fierce and terrible animals of the creation. But nothing is so opposite to its natural character, nothing so different from the life it is contented to lead. It never attacks others; and instead of the bill, when attacked, it rather makes use of its legs, and kicks like an horse, or runs against its pursuer, beats him down, and treads him to the ground.

The manner of going of this animal is not less extraordinary than its appearance. Instead of going directly forward, it seems to kick up behind with one leg, and then making a bound onward with the other, it goes with such prodigious velocity, that the swiftest racer would be left far behind.

The same degree of voraciousness which we perceived in the ostrich, obtains as strongly here. The cassowary swallows every thing that comes within the capacity of its gullet. The Dutch assert that it can devour not only glass, iron, and stones, but even live and burning coals, without testifying the smallest fear, or feeling the least injury. It is said that the passage of the food through its gullet is performed so speedily, that even the very eggs which it has swallowed whole, pass through it unbroken, in the same form
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they went down. The cassowary's eggs are of a grey ash colour, inclining to green. The largest is found to be fifteen inches round one way, and about twelve the other.

The southern parts of the most eastern Indies seems to be the natural climate of the cassowary. His domain, if we may so call it, begins where that of the ostrich terminates. The latter has never been found beyond the Ganges; while the cassowary is never seen nearer than the islands of Banda, Sumatra, Java, the Molucca Islands, and the corresponding parts of the continent.

THE DODO instead of exciting the idea of swiftness by its appearance, seems to strike the imagination as a thing the most unwieldy and inactive of all nature. Its body is massive, almost round, and covered with grey feathers; it is just barely supported upon two short thick legs like pillars. The neck, thick and puffy, is joined to the head, which consists of two great chaps, that open far behind the eyes, which are large, black and prominent; so that the animal when it gapes seems to be all mouth. The bill therefore is of an extraordinary length, not flat and broad, but thick, and of a bluish white, sharp at the end, and each chap crooked in opposite directions. From all this results a stupid and voracious physiognomy; which is still more increased by a bordering of feathers round the root of the beak, and which give the appearance of an hood or cowl. The Dodo is furnished with wings, covered with soft ash-coloured feathers, but they are too short to assist it in flying. It is furnished with a tail, with a few small curled feathers; but this tail is disproportioned and displaced. Its legs are too short for running, and its body too fat to be strong.

This bird is a native of the Isle of France; and the Dutch, who first discovered it there, called it in their language the *nauseous bird*, as well from its disgusting figure, as from the bad taste of its flesh. However, succeeding observers contradict this first report, and assert that its flesh is good and wholesome eating. It is a simple bird, and is very easily taken. Three or four dodos are enough to dine an hundred men.

THE GOLDEN EAGLE is the largest and the noblest of all those birds that have received the name of eagle. It weighs above twelve pounds. Its length is three feet; the extent of its wings, seven feet four inches; the bill is three

inches long, and of a deep blue; and the eye of an hazel colour. The sight and sense of smelling are very acute. The head and neck are clothed with narrow, sharp pointed feathers, of a deep brown colour, bordered with tawny; but those on the crown of the head, in very old birds, turn grey. The whole body, above as well as beneath, is of a dark brown; and the feathers of the back are finely clouded with a deeper shade of the same. The wings when clothed reach to the end of the tail. The quill feathers are of a chocolate colour, the shafts white. The tail is of a deep brown; irregularly barred and blotched with an obscure ash-colour, and usually white at the roots of the feathers. The legs are yellow, short, and very strong, being three inches in circumference, and feathered to the very feet. The toes are covered with large scales, and armed with the most formidable claws, the middle of which are two inches long.

In the rear of this terrible bird follow the *ring-tailed eagle*, the *common eagle*, the *bald eagle*, the *white eagle*, the *kough-footed eagle*, the *erne*, the *black eagle*, the *osprey*, the *sea-eagle*, and the *crowned eagle*. These, and others that might be added, form different shades in this fierce family; but have all the same rapacity, the same general form, the same habits, and the same manner of bringing up their young.

In general, these birds are found in mountainous and ill-peopled countries, and breed among the loftiest cliffs. They choose those places which are remotest from man, upon whose possessions they but seldom make their depredations, being contented rather to follow the wild game in the forest, than to risque their safety to satisfy their hunger.

It requires great patience and much art to tame an eagle; and even though taken young, and brought under by long assiduity, yet still it is a dangerous domestic, and often turns its force against its master. When brought into the field for the purposes of fowling, the falconer is never sure of its attachment: that innate pride, and love of liberty, still prompt it to regain its native solitudes; and the moment the falconer sees it, when let loose, first stoop towards the ground, and then rise perpendicularly into the clouds, he gives up all his former labour for lost; quite sure of never beholding his late prisoner more. Sometimes, however, they are brought to have an attachment for their feeder: they are then highly serviceable, and liberally provide for his pleasures and support. When the falconer lets them go from his hand, they play

play about and hover round him till their game presents, which they see at an immense distance, and pursue with certain destruction.

Of all animals the eagle flies highest. Of all birds also, he has the quickest eye; but his sense of smelling is far inferior to that of the vulture. He never pursues, therefore, but in sight; and when he has seized his prey, he stoops from his height, as if to examine its weight, always laying it on the ground before he carries it off. As his wing is very powerful, yet, as he has but little suppleness in the joints of the leg, he finds it difficult to rise when down; however, if not instantly pursued, he finds no difficulty in carrying off geese and cranes. He also carries away hares, lambs, and kids; and often destroys fawns and calves, to drink their blood, and carries a part of their flesh to his retreat. Infants themselves, when left unattended, have been destroyed by these rapacious creatures; which probably gave rise to the fable of Ganymede's being snatched up by an eagle to heaven.

An instance is recorded in Scotland of two children being carried off by eagles; but fortunately they received no hurt by the way; and, the eagles being pursued, the children were restored unhurt out of the nests to the affrighted parents.

The eagle is thus at all times a formidable neighbour; but peculiarly when bringing up its young. It is then that the female, as well as the male, exert all their force and industry to supply their young. Smith, in his History of Kerry, relates, that a poor man in that country got a comfortable subsistence for his family, during a summer of famine, out of an eagle's nest, by robbing the eaglets of food, which were plentifully supplied by the old ones. He protracted their assiduity beyond the usual time, by clipping the wings, and retarding the flight of the young.

It happened some time ago, in the same country, that a peasant resolved to rob the nest of an eagle, that had built in a small island, in the beautiful lake of Killarney. He accordingly stripped, and swam in upon the island, while the old ones were away; and, robbing the nest of its young, he was preparing to swim back, with the eaglets tied in a string; but, while he was yet up to his chin in the water, the old eagles returned, and, missing their young, quickly fell upon the plunderer, and, in spite of all his resistance, dispatched him with their beaks and talons.

In order to extirpate these pernicious birds, there is a law in the Orkney Islands, which entitles any person that kills an

eagle to a hen out of every house in the parish in which the plunderer is killed.

The nest of the eagle is usually built in the most inaccessible cliff of the rock, and often shielded from the weather by some jutting crag that hangs over it. Sometimes, however, it is wholly exposed to the winds, as well side-ways as above; for the nest is flat, though built with great labour. It is said that the same nest serves the eagle during life; and indeed the pains bestowed in forming it seems to argue as much. It is asserted, that as soon as the young ones are somewhat grown, the mother kills the most feeble or the most voracious. If this happens, it must proceed only from the necessities of the parent, who is incapable of providing for their support; and is content to sacrifice a part to the welfare of the majority.

The plumage of the eaglets is not so strongly marked as when they come to be adult. They are at first white; then inclining to yellow; and at last of light brown. Age, hunger, long captivity, and diseases, make them whiter. It is said, that they live above an hundred years: and that they at last die, not of old age, but from the beak's turning inward upon the under mandible, and thus preventing their taking any food. They are indeed equally remarkable, for their longevity, and for their power of sustaining a long absence from food. One of this species, which has now been nine years in the possession of Mr. Owen Holland, of Conway, lived thirty-two years with the gentleman who made him a present of it; but what its age was when the latter received it from Ireland, is unknown. The same bird also furnishes a proof of the truth of the other remark; having once, through the neglect of servants, endured hunger for twenty-one days, without any sustenance whatever.

Such are the general characteristics and habitudes of the eagle; however, in some these habitudes differ, as the sea eagle and the osprey live chiefly upon fish, and consequently build their nests on the sea-shore, and by the sides of rivers, on the ground among reeds; and often lay three or four eggs, rather less than those of a hen, of a white elliptical form. They catch their prey, which is chiefly fish, by darting down upon them from above. The Italians compare the violent descent of these birds on their prey, to the fall of lead into water; and call them *aquila piombina*, or the leaden eagle.

Nor is the bald eagle, which is an inhabitant of North Carolina, less remarkable for habits peculiar to itself. These birds fly very heavily; so that they cannot overtake their prey,

prey, like others of the same denomination. To remedy this, they often attend a sort of fishing hawk, which they pursue, and strip the plunderer of its prey. This is the more remarkable, as this hawk flies swifter than they. These eagles also generally attend upon fowlers in the winter; and when any birds are wounded, they are sure to be seized by the eagle, though they may fly from the fowler. This bird will often also steal young pigs, and carry them alive to the nest, which is composed of twigs, sticks, and rubbish: it is large enough to fill the body of a cart; and is commonly full of bones half eaten, and putrid flesh, the stench of which is intolerable.

The distinctive marks of each species are as follow.

The *golden eagle*: of a tawny, iron colour; the head and neck of a reddish iron; the tail feathers of a dirty white, marked with cross bands of tawny iron; the legs covered with tawny iron feathers.

The *common eagle*: of a brown colour: the head and upper part of the neck inclining to red; the tail feathers white, blackening at the ends; the outer ones, on each side, of an ash colour, the legs covered with feathers of a reddish brown.

The *bald eagle*: brown: the head, neck and tail feathers white; the feathers of the upper part of the leg brown.

The *white eagle*: the whole white.

The *kough-footed eagle*: of a dirty brown: spotted under the wings, and on the legs, with white: the feathers of the tail white at the beginning and the point; the leg feathers dirty brown, spotted with white.

The *white-tailed eagle*: dirty brown: head white; the stems of the feathers black; the rump inclining to black; the tail-feathers, the first half black, the end half white; legs naked.

The *erne*: a dirty iron colour above, an iron mixed with black below: the head and neck ash, mixed with chestnut; the points of the wings blackish, the tail-feathers white; the legs naked.

The *black eagle*: blackish: the head and upper neck mixed with red; the tail-feathers, the first half white, speckled with black; the other half, blackish; the leg-feathers dirty white.

The *sea eagle*: inclining to white, mixed with iron brown; belly white, with iron-coloured spots; the covert feathers of the tail whitish; the tail-feathers black at the extremity;

extremity; the upper part of the leg-feathers of an iron brown.

The *osprey*: brown above; white below; the back of the head white; the outward tail-feathers, on the inner side, streaked with white; legs naked.

The *jean le blanc*: above, brownish grey; below, white, spotted with tawny brown; the tail feathers on the outside, and at the extremity, brown; on the inside, white, streaked with brown; legs naked.

The *eagle of Brasil*: blackish brown: ash colour, mixed in the wings; tail-feathers white; legs naked.

The *Oroonoko eagle*: with a topping, above, blackish brown; below, white, spotted with black; upper neck yellow; tail-feathers brown, with white circles; leg-feathers white, spotted with black.

The *crowned African eagle*, with a topping: the tail of an ash-colour, streaked on the upper side with black.

The *eagle of Pondicherry*: chefnut colour, the six outward tail-feathers black one half.

THE CONDOR possesses, in an higher degree than the eagle, all the qualities that render it formidable, not only to the feathered kind, but to beasts, and even to man himself. It is eighteen feet across, the wings extended. The beak is so strong as to pierce the body of a cow; and two of them are able to devour it. They do not even abstain from man himself: but fortunately there are but few of the species. The Indians assert, that they will carry off a deer, or a young calf, in their talons, as eagles would an hare or a rabbit. They seldom frequent the forests, as they require a large space for the display of their wings; but are found on the sea-shore, and the banks of rivers, whither they descend, at certain seasons, from their heights of the mountains. Condamine has frequently seen them in several parts of the mountains of Quito, and observed them hovering over a flock of sheep; and he thinks they would, at a certain time, have attempted to carry one off, had they not been scared away by the shepherds. The condor is of a brown colour.

It is doubted whether this animal be proper to America only, or whether it may not have been described by the naturalists of other countries. It is supposed, that the great bird, called the Rock, described by Arabian writers, and so much exaggerated by fable, is but a species of the condor. The great bird of Tarnassar, in the East Indies, which is larger

larger than the eagle, as well as the vulture of Senegal, which carries off children, are probably no other than the bird we have been describing. Russia, Lapland, and even Switzerland and Germany, are said to have known this animal. In the deserts of Pachomac, where it is chiefly seen, men seldom venture to travel. Those wild regions are very sufficient of themselves to inspire a secret horror: broken precipices—prowling panthers—forests only vocal with the hissing of serpents—and mountains rendered still more terrible by the condor, the only bird that ventures to make its residence in those deserted situations.

VULTURES may be easily distinguished from all those of the eagle kind, by the nakedness of their heads and necks, which are without feathers, and only covered with a very slight down, or a few scattered hairs. Their eyes are more prominent; those of the eagle being buried more in the socket. The claws are shorter, and less hooked. The inside of the wing is covered with a thick down, which is different in them from all other birds of prey. Their attitude is not so upright as that of the eagle; and their flight more difficult and heavy.

In this tribe we may range the golden, the ash-coloured, and the brown vulture, which are inhabitants of Europe; the spotted, and the black vulture of Egypt; the bearded vulture, the Brazilian vulture, and the king of the vultures of South America.

The *Golden Vulture* seems to be the foremost of the kind; and is in many things like the golden eagle, but larger in every proportion. From the end of the beak to that of the tail, it is four feet and an half, and to the claws end, forty-five inches. The lower part of the neck, breast, and belly, are of a red colour; but on the tail it is more faint, and deeper near the head. The feathers are black on the back; and on the wings and tail, of a yellowish brown. Others of the kind differ from this in colour and dimensions; but they are all strongly marked by their naked heads, and beak straight in the beginning, but hooking at the point.

They are still more strongly marked by their nature, which in all vultures is cruel, unclean, and indolent. Their sense of smelling, however, is amazingly great; and Nature, for this purpose, has given them two large apertures or nostrils without, and an extensive olfactory membrane within. They seem adapted inwardly, not only for being carnivorous,

vorous, but to eat corn, or whatever of that kind comes in their way.

This bird, which is common in many parts of Europe, and but too well known on the western continent, is totally unknown in England. In Egypt, Arabia, and many other kingdoms of Africa and Asia, vultures are found in great abundance. The inside down of their wing is converted into a very warm and comfortable kind of fur, and is commonly sold in the Asiatic markets.

In Egypt, indeed, this bird seems to be of singular service. There are great flocks of them in the neighbourhood of Grand Cairo, which no person is permitted to destroy. The service they render the inhabitants, is devouring all the carrion and filth of that great city; which might otherwise tend to corrupt and putrefy the air. They are commonly seen in company with the wild dogs of the country, tearing a carcass very deliberately together. This odd association produces no quarrels; the birds and quadrupeds seem to live amicably, and nothing but harmony subsists between them. The wonder is still the greater, as both are extremely rapacious, and both lean and bony to a very great degree; probably having no great plenty even of the wretched food on which they subsist.

In America, they lead a life somewhat similar. Wherever the hunters, who there only pursue beasts for the skins, are found to go, these birds are seen to pursue them. They still keep hovering at a little distance; and when they see the beast flayed and abandoned, they call out to each other, pour down upon the carcass, and, in an instant, pick its bones as bare and clean as if they had been scraped by a knife.

The sloth, the filth, and the voraciousness of these birds, almost exceed credibility. In the Brazils, where they are found in great abundance, when they light upon a carcass, which they have liberty to tear at their ease, they so gorge themselves, that they are unable to fly; but keep hopping along when they are pursued. At all times, they are a bird of slow flight, and unable readily to raise themselves from the ground; but when they have over-fed, they are then utterly helpless; but they soon get rid of their burthen; for they have a method of vomiting up what they have eaten, and then they fly off with greater facility.

It is pleasant to be a spectator of the hostilities between animals that are thus hateful or noxious. Of all creatures, the two most at enmity, is the vulture of Brazil, and

and the crocodile. The female of this terrible amphibious creature, which in the rivers of that part of the world grows to the size of twenty-seven feet, lays its eggs, to the number of one or two hundred, in the sands, on the side of the river, where they are hatched by the heat of the climate. For this purpose, she takes every precaution to hide from all other animals the place where she deposits her burthen: in the mean time, a number of vultures, fit, silent and unseen, in the branches of some neighbouring forest, and view the crocodile's operations, with the pleasing expectation of succeeding plunder. They patiently wait till the crocodile has laid the whole number of her eggs, till she has covered them carefully under the sand, and until she is retired from them to a convenient distance. Then, all together, encouraging each other with cries, they pour down upon the nest, hook up the sand in a moment, lay the eggs bare, and devour the whole brood without remorse. Wretched as is the flesh of these animals, yet men, perhaps, when pressed by hunger, have been tempted to taste it. Nothing can be more lean, stringy, nauseous, and unsavory. It is in vain that, when killed, the rump has been cut off; in vain the body has been washed, and spices used to overpower its prevailing odour; it still smells and tastes of the carrion by which it was nourished, and sends forth a stench that is insupportable. These birds, at least those of Europe, usually lay two eggs at a time, and produce but once a year. They make their nests in inaccessible cliffs, and in places so remote that it is rare to find them.

OF THE FALCON KIND.] Falconry, which is now so much disused among us, was the principal amusement of our ancestors. A person of rank scarce stirred out without his hawk on his hand, which in old paintings is the criterion of nobility. The expence which attended this sport was very great: among the old Welch princes, the king's falconer was the fourth officer in the state; but, notwithstanding all his honours, he was forbid to take more than three draughts of beer from his horn, lest he should get drunk and neglect his duty. In the reign of James the First, Sir Thomas Monton is said to have given a thousand pounds for a cast of hawks; and such was their value in general, that it was made felony in the reign of Edward the Third to steal a hawk. To take its eggs, even in a person's own ground, was punishable with imprisonment for a year and a day, together with a fine at the king's pleasure.

Of many of the ancient falcons used for this purpose, we at this time know only the names. Of those in use at present, both here and in other countries, are the gyr-falcon, the falcon, the lanner, the sacre, the hobby, the kestrel, and the merlin. These are called the long-winged hawks, to distinguish them from the goshawk, the sparrow-hawk, the kite, and the buzzard, that are of shorter wing, and either too slow, too cowardly, too indolent, or too obstinate, to be serviceable in contributing to the pleasures of the field.

The *gyr-falcon* leads in this bold train. He exceeds all other falcons in the largeness of his size, for he approaches nearly to the magnitude of the eagle. The top of the head is flat, and of an ash colour, with a strong, thick, short, and blue beak. The feathers of the back and wings are marked with black spots, in the shape of an heart; he is a courageous and fierce bird, nor fears even the eagle himself; but he chiefly flies at the stork, the heron, and the crane. He is mostly found in the colder regions of the north, but loses neither his strength nor his courage when brought into the milder climates.

The *falcon*, properly so called, is the second in magnitude and fame. There are some varieties in this bird; but there seem to be only two that claim distinction; the falcon-gentil and the peregrine-falcon; both are much less than the gyr, and somewhat about the size of a raven. Next in size to these is the *lanner*, a bird now very little known in Europe; then follows the *sacre*, the legs of which are of a bluish colour, and serve to distinguish that bird; to them succeeds the hobby, used for smaller game, for daring larks, and stooping at quails. The kestrel was trained for the same purposes; and lastly the merlin; which though the smallest of all the hawk or falcon kind, and not much larger than a thrush, yet displays a degree of courage that renders him formidable even to birds ten times his size. He has often been known to kill a partridge or a quail at a single pounce from above.

The courage of these creatures in general was such, that no bird, not very much above their own size, could terrify them; their swiftness so great, that scarce any bird could escape them; and their docility so remarkable, that they obeyed not only the commands, but the signs of their master. They remained quietly perched upon his hand till their game was flushed, or else kept hovering round his head, without ever leaving him but when he gave permission. The common

mon falcon is a bird of such spirit, that like a conqueror in a country, he keeps all birds in awe and in subjection to his prowess. Where he is seen flying wild, as I often had an opportunity of observing, the birds of every kind, that seemed entirely to disregard the kite or the sparrow-hawk, fly with screams at his most distant appearance.

In order to train up a falcon, the master begins by clapping straps upon his legs, which are called jesses, to which there is fastened a ring with the owner's name, by which, in case he should be lost, the finder may know where to bring him back. To these also are added little bells, which serve to mark the place where he is, if lost in the chase. He is always carried on the hand, and is obliged to be kept without sleeping. If he be stubborn, and attempts to bite, his head is plunged into water. Thus, by hunger, watching, and fatigue, he is constrained to submit to having his head covered by a hood or cowl, which covers his eyes. This troublesome employment continues often for three days and nights without ceasing. It rarely happens but at the end of this his necessities, and the privation of light make him lose all idea of liberty, and bring down his natural wildness. His master judges of his being tamed when he permits his head to be covered without resistance, and when uncovered he seizes the meat before him contentedly. The repetition of these lessons by degrees ensures success. His wants being the chief principle of his dependance, it is endeavoured to encrease his appetite by giving him little balls of flannel, which he greedily swallows. Having thus excited the appetite, care is taken to satisfy it; and thus gratitude attaches the bird to the man who but just before had been his tormentor.

When the first lessons have succeeded, and the bird shews signs of docility, he is carried out upon some green, the head is uncovered, and, by flattering him with food at different times, he is taught to jump on the hand, and to continue there. When confirmed in this habit, it is then thought time to make him acquainted with the lure. This lure is only a thing stuffed like the bird the falcon is designed to pursue, such as an heron, a pigeon, or a quail, and on this lure they always take care to give him his food. It is quite necessary that the bird should not only be acquainted with this but fond of it, and delicate in his food when shewn it. The use of this lure is to flatter him back when he has flown in the air, which it sometimes fails to do; and it is always requisite to assist it by the voice and the signs of the master.

master. When the familiarity and the docility of the bird are sufficiently confirmed on the green, he is then carried into the open fields, but still kept fast by a string which is about twenty yards long. He is then uncovered as before; and the falconer, calling him at some paces distance, shews him the lure. When he flies upon it he is permitted to take a large morsel of the food which is tied to it. The next day the lure is shewn him at a greater distance, till he comes at last to fly to it at the utmost length of his string. He is then to be shewn the game itself alive, but disabled or tame, which he is designed to pursue. After having seized this several times with his string, he is then left entirely at liberty, and carried into the field for the purposes of pursuing that which is wild. At that he flies with avidity; and when he has seized it, or killed it, he is brought back by the voice and the lure.

By this method of instruction, an hawk may be taught to fly at any game whatsoever; but falconers have chiefly confined their pursuit only to such animals as yield them profit by the capture, or pleasure in the pursuit. The hare, the partridge, and the quail, repay the trouble of taking them; but the most delightful sport is the falcon's pursuit of the heron, the kite, or the wood-lark. Instead of flying directly forward, as some other birds do, these, when they see themselves threatened by the approach of the hawk, immediately take to the skies. They fly almost perpendicularly upward, while their ardent pursuer keeps pace with their flight, and tries to rise above them. Thus both diminish by degrees from the gazing spectator below, till they are quite lost in the clouds; but they are soon seen descending, struggling together, and using every effort on both sides; the one of rapacious insult, the other of desperate defence. The unequal combat is soon at an end: the falcon comes off victorious, and the other, killed or disabled, is made a prey either to the bird or the sportsman.

As for other birds, they are not so much pursued, as they generally fly straight forward, by which the sportsman loses sight of the chace, and what is still worse, runs a chance of losing his falcon also. The pursuit of the lark by a couple of merlins is considered, by him only who regards the sagacity of the chace, as one of the most delightful spectacles this exercise can afford. The amusement is, to see one of the merlins climbing to get the ascendant of the lark, while the other, lying low for the best advantage, waits the success of its companion's efforts; thus while the one stoops to strike its prey, the other seizes it at its coming down.

The

The more ignoble race of birds make up by cunning and assiduity what these claim by force and celerity. The kite, which may be distinguished from all the rest of this tribe by his forked tail, and his slow floating motion, seems almost for ever upon the wing. He lives only upon accidental carnage, as almost every bird in the air is able to make good his retreat against him. He may be therefore considered as an insidious thief who only prowls about, and, when he finds a small bird wounded, or a young chicken strayed too far from the mother, instantly seizes the hour of calamity, and, like a famished glutton, is sure to shew no mercy. His hunger, indeed, often urges him to acts of seeming desperation. I have seen one of them fly round and round for a while to mark a clutch of chickens, and then on a sudden dart like lightning upon the unresisting little animal, and carry it off, the hen in vain crying out, and the boys hooting and casting stones to scare it from its plunder. For this reason, of all birds the kite is the good housewife's greatest tormentor and aversion.

Of all obscene birds, the KITE is the best known; but the buzzard among us is the most plenty. He is a sluggish, inactive bird, and often remains perched whole days together upon the same bough. He is rather an assassin than a pursuer; and lives more upon frogs, mice, and insects, which he can easily seize, than upon birds which he is obliged to follow. He lives in summer by robbing the nests of other birds, and sucking their eggs, and more resembles the owl kind in his countenance than any other rapacious bird of day. The goshawk and sparrowhawk are what Mr. Willoughby calls short-winged birds, and consequently unfit for training, however injurious they may be to the pigeon-house or the sportsman. They have been indeed taught to fly at game; but little is to be obtained from their efforts, being difficult of instruction and capricious in their obedience.

THE BUTCHER BIRD.] Before I conclude this short history of rapacious birds that prey by day, I must take leave to describe a tribe of smaller birds, that seem from their size rather to be classed with the harmless order of the sparrow-kind; but that from their crooked beak, courage, and appetites for slaughter, certainly deserve a place here. The lesser butcher-bird is not much above the size of a lark; that of the smallest species is not so big as a sparrow; yet, diminutive as these little animals are, they make themselves formidable to birds of four times their dimensions.

The greater butcher-bird is about as large as a thrush; its bill is black, an inch long, and hooked at the end; at the same time its legs and feet are slender, and its toes are formed rather like those of such as live chiefly upon insects and grain. Its habits, indeed, seem to correspond with its conformation, and it lives as well upon flesh as upon insects, and thus partakes in some measure of a double nature. Its appetite for flesh, however, is the most prevalent; and it never takes up with the former when it can obtain the latter. This bird, therefore, leads a life of continual combat and opposition. As from its size it does not much terrify the smaller birds of the forest, so it very frequently meets birds willing to try its strength, and it never declines the engagement.

It is wonderful to see with what intrepidity this little creature goes to war with the pie, the crow, and the kestrel, all above four times larger than itself. It not only fights upon the defensive, but often comes to the attack, and always with advantage, particularly when the male and female unite to protect their young, and to drive away the more powerful birds of rapine. At that season, they do not wait the approach of their invader; it is sufficient that they see him preparing for the assault at a distance. It is then that they fall forth with loud cries, wound him on every side, and drive him off with such fury, that he seldom ventures to return to the charge. In these disputes, they generally come off with victory; though it sometimes happens that they fall to the ground with the bird they have so fiercely fixed upon, and the combat ends with the destruction of the assailant as well as of the defender.

For this reason, the most redoubtable birds of prey respect them; while the kite, the buzzard, and the crow, seem rather to fear than seek the engagement. Nothing in nature better displays the respect paid to the claims of courage, than to see this little bird, apparently so contemptible, fly in company with the lanner, the falcon, and all the tyrants of the air, without fearing their power, or avoiding their resentment.

As for small birds, they are its usual food. It seizes them by the throat, and strangles them in an instant. When it has thus killed the bird or insect, it is asserted by the best authority, that it fixes them upon some neighbouring thorn, and, when thus spitted, pulls them to pieces with its bill. It is supposed that as Nature has not given this bird strength sufficient to tear its prey to pieces with its feet, as the hawks do,

do, it is obliged to have recourse to this extraordinary expedient.

During summer, such of them as constantly reside here, for the smaller red butcher-bird migrates, remain among the mountainous parts of the country; but in winter they descend into the plains and nearer human habitations. The larger kind make their nests on the highest trees, while the lesser build in bushes in the fields and hedge-rows. They both lay about six eggs, of a white colour, but encircled at the larger end with a ring of brownish red. The nest on the outside is composed of white moss, interwoven with long grass; within, it is well lined with wool, and it is usually fixed among the forking branches of a tree. The female feeds her young with caterpillars and other insects while very young; but soon after accustoms them to flesh, which the male procures with surprising industry. Their nature also is very different from other birds of prey in their parental care; for, so far from driving out their young from the nest to shift for themselves, they keep them with care; and even when adult they do not forsake them, but the whole brood live in one family together. Each family lives apart, and is generally composed of the male, female, and five or six young ones; these all maintain peace and subordination among each other, and hunt in concert. It is easy to distinguish these birds at a distance, not only from their going in companies, but also from their manner of flying, which is always up and down, seldom direct or side-ways.

Of these birds there are three or four different kinds; but the greater ash-coloured butcher-bird is the least known among us. The red backed butcher-bird migrates in autumn, and does not return till spring. The woodchat resembles the former, except in the colour of the back, which is brown, and not red as in the other. There is still another, less than either of the former, found in the marshes near London. This too is a bird of prey, although not much bigger than a tit-mouse; an evident proof that an animal's courage or rapacity does not depend upon its size.

THE OWL KIND.] All birds of the owl kind have one common mark, by which they are distinguished from others; their eyes, like those of tigers and cats, are formed for seeing better in the dusk, than in the broad glare of sun-shine. The pupil in fact is capable of opening very wide, or shutting very close; and by contracting it, the brighter light of

the day, which would act too powerfully upon the sensibility of the eye, is excluded; while by dilating the pupil, the animal takes in the more faint rays of the night, and thereby is enabled to spy its prey, and catch it with greater facility in the dark.

But though owls are dazzled by too bright a day-light, yet they do not see best in the darkest nights, as some have been apt to imagine.

The nights when the moon shines are the times of their most successful plunder; for when it is wholly dark, they are less qualified for seeing and pursuing their prey: except, therefore by moonlight, they contract the hours of their chase; and if they come out at the approach of dusk in the evening, they return before it is totally dark, and then rise by twilight the next morning, to pursue their game, and to return, in like manner, before the broad day-light begins to dazzle them with its splendor.

Yet the faculty of seeing in the night, or of being entirely dazzled by day, is not alike in every species of these nocturnal birds. The common WHITE or BARN OWL, for instance, sees with such exquisite acuteness in the dark, that though the barn has been shut at night, and the light thus totally excluded, yet it perceives the smallest mouse that peeps from its hole: on the contrary, the brown horned owl is often seen to prowl along the hedges by day, like the sparrow-hawk; and sometimes with good success.

All birds of the owl kind may be divided into two sorts; those that have horns, and those without. These horns are nothing more than two or three feathers that stand up on each side of the head over the ear, and give this animal a kind of horned appearance. Of the horned kind, is the *great horned owl*, which at first view appears as large as an eagle, though when he comes to be observed more closely he will be found much less. His eyes are large and transparent, encircled with an orange-coloured iris: his ears are large and deep: his plumage is of a reddish brown, marked on the back with black and yellow spots, and yellow only upon the belly.

Next to this is the *common horned owl*, of a much smaller size than the former, and with horns much shorter. As the great owl was five feet from the tip of one wing to the other, this is but three. The horns are but about an inch long, and consist of six feathers, variegated with black and yellow.

There is still a smaller kind of the horned owl, which is not much larger than a black-bird; and whose horns are remarkably

markably short, being composed but of one feather, and that not above half an inch high.

To these succeeds the tribe without horns. The *howlet*, which is the largest of this kind, with dusky plumes, and black eyes; the *screech owl*, of a smaller size, with blue eyes, and plumage of an iron grey; the *white owl*, about as large as the former, with yellow eyes and whitish plumage; the *great brown owl*, less than the former, with brown plumage and a brown beak; and lastly, the *little brown owl*, with yellowish-coloured eyes, and an orange-coloured bill.

All this tribe of animals, however they may differ in their size and plumage, agree in their general characteristics of preying by night; their bodies are strong and muscular; their feet and claws made for tearing their prey; and their stomachs for digesting it. It must be remarked, however, that the digestion of all birds that live upon mice, lizards, or such like food, is not very perfect; for though they swallow them whole, yet they are always seen some time after to disgorge the skin and bones, rolled up in a pellet, as being indigestible.

As they are incapable of supporting the light of the day, or at least of then seeing and readily avoiding their danger, they keep all this time concealed in some obscure retreat, suited to their gloomy appetites, and there continue in solitude and silence. The cavern of a rock, the darkest part of an hollow tree, the battlements of a ruined unfrequented castle, some obscure hole in a farmer's out-house, are the places where they are usually found: if they be seen out of these retreats in the day-time, they may be considered as having lost their way; as having by some accident been thrown into the midst of their enemies, and surrounded with danger.

In this distress they are obliged to take shelter in the first tree or hedge that offers, there to continue concealed all day, till the returning darkness once more supplies them with a better plan of the country. But it too often happens that, with all their precaution to conceal themselves, they are spied out by the other birds of the place, and are sure to receive no mercy. The black-bird, the thrush, the jay, the bunting, and the red-breast, all come in file, and employ their little arts of insult and abuse. The smallest, the feeblest, and the most contemptible of this unfortunate bird's enemies, are then the foremost to injure and torment him. They increase their cries and turbulence round him, flap him with their wings, and are ready to shew their courage to be great, as they are sensible that their danger is but small. The unfortunate owl, not knowing where to attack or where to fly,

patiently sits and suffers all their insults. Astonished and dizzy, he only replies to their mockeries by awkward and ridiculous gestures, by turning his head, and rolling his eyes with an air of stupidity. It is enough that an owl appears by day to set the whole grove into a kind of uproar. Either the aversion all the small birds have to this animal, or the consciousness of their own security, makes them pursue him without ceasing, while they encourage each other by their mutual cries to lend assistance in this laudable undertaking.

It sometimes happens, however, that the little birds pursue their insults with the same imprudent zeal with which the owl himself had pursued his depredations. They hunt him the whole day until evening returns; which restoring him his faculties of sight once more, he makes the foremost of his pursuers pay dear for their former sport: nor is man always an unconcerned spectator here. The bird-catchers have got an art of counterfeiting the cry of the owl exactly; and, having before limed the branches of an hedge, they sit unseen and give the call. At this, all the little birds flock to the place where they expect to find their well-known enemy; but instead of finding their stupid antagonist, they are stuck fast to the hedge themselves. This sport must be put in practice an hour before night-fall, in order to be successful; for if it is put off till later, those birds which but a few minutes sooner came to provoke their enemy, will then fly from him with as much terror as they just before shewed insolence.

It is not unpleasant to see one stupid bird made in some sort a decoy to deceive another. The great horned owl is sometimes made use of for this purpose, to lure the kite, when falconers desire to catch him for the purposes of training the falcon. Upon this occasion they clap the tail of a fox to the great owl, to render his figure extraordinary; in which trim he sails slowly along, flying low, which is his usual manner. The kite, either curious to observe this odd kind of animal, or perhaps inquisitive to see whether it may not be proper for food, flies after, and comes nearer and nearer. In this manner he continues to hover, and sometimes to descend, till the falconer setting a strong-winged hawk against him, seizes him for the purpose of training his young ones at home.

The usual place where the great horned owl breeds is in the cavern of a rock, the hollow of a tree, or the turret of some ruined castle. Its nest is near three feet in diameter, and composed of sticks, bound together by the fibrous roots

of trees, and lined with leaves on the inside. It lays about three eggs, which are larger than those of a hen, and of a colour somewhat resembling the bird itself. The lesser owl of this kind never makes a nest for itself, but always takes up with the old nest of some other bird, which it has often been forced to abandon. It lays four or five eggs; and the young are all white at first, but change colour in about a fortnight. The other owls in general build near the place where they chiefly prey; that which feeds upon birds in some neighbouring grove, that which preys chiefly upon mice near some farmer's yard, where the proprietor of the place takes care to give it perfect security. In fact, whatever mischief one species of owl may do in the woods, the barn-owl makes a sufficient recompense for, by being equally active in destroying mice nearer home; so that a single owl is said to be more serviceable than half a dozen cats in ridding the barn of its domestic vermin. "In the year 1580," says an old writer, "at Hallontide, an army of mice so over-run the marshes near Southminster, that they eat up the grass to the very roots. But at length a great number of strange painted owls came and devoured all the mice. The like happened again in Essex about sixty years after."

C H A P. XXIV.

Of Birds of the Poultry kind—The Cock—The Peacock—The Turkey—The Pheasant—The Guinea Fowl—The Bustard—The Grouse, black Game, &c.—The Partridge—The Quail.

THE COCK.] **O**F all birds the cock seems to be the oldest companion of mankind, to have been first reclaimed from the forest, and taken to supply the accidental failure of the luxuries or necessities of life. As he is thus longest under the care of man, so perhaps he exhibits the greatest number of varieties, there being scarcely two birds of this species that exactly resemble each other in plumage and form.

It is not well ascertained when the cock was first made domestic in Europe; but it is generally agreed that we first had him in our western world from the kingdom of Persia. The cock is found wild in the island of Tinian, in many others of the Indian ocean, and in the woods on the coasts of Malabar; his plumage is black and yellow, and his comb and wattles yellow and purple. There is another peculiarity

also in those of the Indian woods; their bones which when boiled with us are white, as every body knows, in those are as black as ebony. Whether this tincture proceeds from their food, as the bones are tintured red by feeding upon madder, I leave to the discussion of others; satisfied with the fact, let us decline speculation.

In their first propagation in Europe, there were distinctions then that now subsist no longer. The ancients esteemed those fowls whose plumage was reddish as invaluable; but as for the white it was considered as utterly unfit for domestic purposes. These they regarded as subject to become a prey to rapacious birds; and less fruitful than the former. No animal in the world has greater courage than the cock when opposed to one of his own species; and in every part of the world where refinement and polished manners have not entirely taken place, cock-fighting is a principal diversion. In China, India, the Philippine Islands, and all over the east, cock fighting is the sport and amusement even of kings and princes. With us it is declining every day; and it is to be hoped it will in time become only the pastime of the lowest vulgar. It is the opinion of many that we have a bolder and more valiant breed than is to be found elsewhere; but the truth is, they have cocks in China as bold, if not bolder, than ours; and, what would still be considered as valuable among cockers here, they have more strength with less weight.

The hen seldom clutches a brood of chickens above once a season, though instances have been known in which they have produced two. The number of eggs a domestic hen will lay in the year are above two hundred, provided she be well fed, and supplied with water and liberty. It matters not much whether she be trodden by the cock or no; she will continue to lay, although all the eggs of this kind can never by hatching be brought to produce a living animal. Her nest is made without any care, if left to herself; a hole scratched into the ground, among a few bushes, is the only preparation she makes for this season of patient expectation. Nature, almost exhausted by its own fecundity, seems to inform her of the proper time for hatching, which she herself testifies by a clucking note, and by discontinuing to lay. If left entirely to herself, the hen would seldom lay above twenty eggs in the same nest, without attempting to hatch them. While she sits, she carefully turns her eggs, and even removes them to different situations; till at length, in about three weeks, the young brood begin to give signs of a desire to burst their confinement. When by the repeated efforts of their bill, they have broken themselves a passage through the shell, the hen still
continues

continues to sit till all are excluded. The strongest and best chickens generally are the first candidates for liberty; the weakest come behind, and some even die in the shell. When all are produced, she then leads them forth to provide for themselves. Her affection and her pride seem then to alter her very nature, and correct her imperfections. No longer voracious or cowardly, she abstains from all food that her young can swallow, and flies boldly at every creature that she thinks is likely to do them mischief.

Ten or twelve chickens are the greatest number that a good hen can rear and clutch at a time; but as this bears no proportion to the number of her eggs, schemes have been imagined to clutch all the eggs of an hen, and thus turn her produce to the greatest advantage. The contrivance I mean is the artificial method of hatching chickens in stoves, as is practised at Grand Cairo; or in a chymical elaboratory properly graduated, as has been effected by Mr. Reaumur. At Grand Cairo, they thus produce six or seven thousand chickens at a time; where, as they are brought forth in their mild spring, which is warmer than our summer, the young ones thrive without clutching. But it is otherwise in our colder and unequal climate; the little animal may, without much difficulty, be hatched from the shell; but they almost all perish when excluded. The cock is a short-lived animal; but how long these birds live, if left to themselves, is not yet well ascertained by any historian. As they are kept only for profit, and in a few years become unfit for generation, there are few that, from mere motives of curiosity, will make the tedious experiment of maintaining a proper number till they die. Aldrovandus hints their age to be ten years; and it is probable that this may be its extent.

THE PEACOCK, by the common people of Italy, is said to have the plumage of an angel, the voice of a devil and the guts of a thief. Our first peacocks were brought from the East-Indies; and we are assured, that they are still found in vast flocks, in a wild state, in the islands of Java and Ceylon. The peacock has in some countries been esteemed as an article of luxury, but whatever there may be of delicacy in the flesh of a young peacock, it is certain an old one is very indifferent eating.

Its fame for delicacy, however, did not continue very long; for we find, in the time of Francis the First, that it was a custom to serve up peacocks to the tables of the great, with an intention not to be eaten, but only to be seen.

Their

Their manner was to strip off the skin; and then preparing the body with the warmest spices, they covered it up again in its former skin, with all its plumage in full display, and no way injured by the preparation. The bird thus prepared, was often preserved for many years without corrupting; and it is asserted of the peacock's flesh, that it keeps longer unputrefied than that of any other animal. To give a higher zest to these entertainments, on weddings particularly, they filled the bird's beak and throat with cotton and camphire, which they set on fire to amuse and delight the company.

Like other birds of the poultry kind, the peacock feeds upon corn; but its chief predilection is for barley. But there is scarcely any food that it will not at times covet and pursue. In the indulgence of these capricious pursuits, walls cannot easily confine it; it strips the tops of houses of their tiles or thatch, it lays waste the labours of the gardener, roots up his choicest feeds, and nips his favourite flowers in the bud. Thus its beauty but ill recompenses for the mischief it occasions; and many of the more homely-looking fowls are very deservedly preferred before it.

The pea-hen seldom lays above five or six eggs in this climate before she sits. Aristotle describes her as laying twelve; and it is probable, in her native climate, she may be thus prolific: for it is certain, that in the forests where they breed naturally, they are numerous beyond expression. The bird lives about twenty years; and not till its third year has it that beautiful variegated plumage that adorns its tail.

THE TURKEY.] The natal place of the cock and the peacock is pretty well ascertained, but there are stronger doubts concerning the turkey; some contending that it has been brought into Europe from the East Indies many centuries ago; while others assert, that it is wholly unknown in that part of the world, that it is a native of the New Continent, and that it was not brought into Europe till the discovery of that part of the world.

With us, when young, it is one of the tenderest of all birds; yet, in its wild state, it is found in great plenty in the forests of Canada, which are covered with snow above three parts of the year. In their natural woods, they are found much larger than in their state of domestic captivity. They are much more beautiful also, their feathers being of a dark grey, bordered at the edges with a bright gold colour.

These

These the savages of the country weave into cloaks to adorn their persons, and fashion into fans and umbrellas, but never once think of taking into keeping animals that the woods furnish them with in sufficient abundance. Savage man seems to find a delight in precarious possession. The hunting of the turkey, therefore, makes one of his principal diversions; as its flesh contributes chiefly to the support of his family. When he has discovered the place of their retreat, which, in general, is near fields of nettles, or where there is plenty of any kind of grain, he takes his dog with him, which is trained to the sport, and he sends him into the midst of the flock. The turkies no sooner perceive their enemy, than they set off running at full speed, and with such swiftness, that they leave the dog far behind them: he follows nevertheless, and sensible they must soon be tired, as they cannot go full speed for any length of time, he, at last, forces them to take shelter in a tree, where they sit quite spent and fatigued, till the hunter comes up, and with a long pole, knocks them down one after the other.

This manner of suffering themselves to be destroyed, argues no great instinct in the animal; and indeed, in their captive state, they do not appear to be possessed of much. They seem a stupid, vain, querulous tribe, apt enough to quarrel among themselves, yet without any weapons to do each other an injury. Every body knows the strange antipathy the turkey-cock has to a red colour. But there is another method of encreasing the animosity of these birds against each other, which is often practised by boys, when they have a mind for a battle. This is no more than to smear over the head of one of the turkies with dirt, and the rest run to attack it with all the speed of impotent animosity: nay, two of them thus disguised, will fight each other till they are almost suffocated with fatigue and anger.

But though so furious among themselves, they are weak and cowardly against other animals, though far less powerful than they. The cock often makes the turkey keep at a distance; and they seldom venture to attack him but with united force, when they rather oppress him by their weight, than annoy him by their arms. There is no animal, how contemptible soever, that will venture boldly to face the turkey-cock, that he will not fly from. On the contrary, with the insolence of a bulley, he pursues any thing that seems to fear him, particularly lap dogs and children, against both which he seems to have a peculiar aversion.

The

The female seems of a milder, gentler disposition. She lays eighteen or twenty eggs. Her young must be carefully fed with curd chopped with dock leaves; but as they grow older, they become more hardy, and follow the mother to considerable distances, in pursuit of insect food, which they prefer to any other. When once grown up, turkies are very hardy birds, and feed themselves at very little expence to the farmer. Those of Norfolk are said to be the largest of this kingdom, weighing from twenty to thirty pounds. There are places, however, in the East Indies, where they are known only in their domestic state, in which they grow to the weight of sixty pounds.

THE PHEASANT.] It would surprise a sportsman to be told that the pheasant which he finds wild in the woods, in the remotest parts of the kingdom, is a foreign bird, and was at first artificially propagated amongst us. They were brought into Europe from the banks of the Phasis, a river of Colchis, in Asia Minor whence they still retain their name.

Next to the peacock, they are the most beautiful of birds, as well for the vivid colour of their plumes, as for their happy mixtures and variety. It is far beyond the power of the pencil to draw any thing so glossy, so bright, or points so finely blending into each other. We are told that when Croesus, king of Lydia, was seated on his throne, adorned with royal magnificence, and all the barbarous pomp of eastern splendour, he asked Solon if he had ever beheld any thing so fine! The Greek philosopher, no way moved by the objects before him, or taking a pride in his native simplicity, replied, that after having seen the beautiful plumage of the pheasant, he could be astonished at no other finery.

In fact, nothing can satisfy the eye with a greater variety and richness of ornament than this beautiful creature. The iris of the eyes is yellow; and the eyes themselves are surrounded with a scarlet colour, sprinkled with small specks of black. On the fore-part of the head there are blackish feathers mixed with a shining purple. The top of the head and the upper part of the neck are tinged with a darkish green that shines like silk. In some, the top of the head is of a shining blue, and the head itself, as well as the upper part of the neck, appears sometimes blue and sometimes green, as it is differently placed to the eye of the spectator. The feathers of the breast, the shoulders, the middle of the back, and the sides under the wings, have a blackish ground, with edges tinged

tinged of an exquisite colour, which appears sometimes black and sometimes purple, according to the different lights it is placed in; under the purple there is a transverse streak of gold colour. The tail, from the middle feathers to the root, is about eighteen inches long; the legs, the feet, and the toes, are of the colour of horn. There are black spurs on the legs, shorter than those of a cock; there is a membrane that connects two of the toes together; and the male is much more beautiful than the female.

This bird, though so beautiful to the eye, is not less delicate when served up to the table. Its flesh is considered as the greatest dainty; and when the old physicians spoke of the wholesomeness of any viands, they made their comparison with the flesh of the pheasant. In the woods, the hen pheasant lays from eighteen to twenty eggs in a season; but in a domestic state she seldom lays above ten. Its fecundity when wild is sufficient to stock the forest; its beautiful plumage adorns it; and its flesh retains a higher flavour from its unlimited freedom.

The pheasant, when full grown, seems to feed indifferently upon every thing that offers. It is said by a French writer, that one of the king's sportsmen shooting at a parcel of crows, that were gathered round a dead carcase, to his great surprize upon coming up, found that he had killed as many pheasants as crows. It is even asserted by some, that such is the carnivorous disposition of this bird, that when several of them are put together in the same yard, if one of them happens to fall sick, or seems to be pining, that all the rest will fall upon, kill, and devour it.

Of the pheasant, as of all other domestic fowl, there are many varieties. There are white pheasants, crested pheasants, spotted pheasants; but of all others, the golden pheasant of China is the most beautiful. It is even a doubt whether the peacock itself can bear the comparison.

THE PINTADA OR GUINEA-HEN.] This is a very remarkable bird, and in some measure unites the characteristics of the pheasant and the turkey. It has the fine delicate shape of the one, and the bare head of the other. To be more particular, it is about the size of a common hen; but as it is supported on longer legs it looks much larger. It has a round back, with a tail turned downwards like a partridge. The head is covered with a kind of casque; and the whole plumage is black or dark grey, speckled with white spots. It has wattles under the bill, which do not proceed from

from the lower chap as in cocks, but from the upper, which gives it a very peculiar air, while its restless gait and odd chuckling sound distinguish it sufficiently from all other birds whatever.

It is well known all over Europe, and we find it in different countries called by different names, from the place whence they had it. We have given it the name of that part of Africa from whence probably it was first brought.

In many parts of their native country, they are seen in vast flocks together, feeding their young, and leading them in quest of food. All their habits are like those of the poultry kind, and they agree in every other respect, except that the male and female are so much alike, that they can hardly be distinguished asunder. Their eggs, like their bodies, are speckled; in our climate, they lay but five or six in a season; but they are far more prolific in their sultry regions at home.

THE BUSTARD is the largest land-bird that is a native of Britain. It was once much more numerous than it is at present; but the increased cultivation of the country, and the extreme delicacy of its flesh, has greatly thinned the species; so that a time may come when it may be doubted whether ever so large a bird was bred among us. It is probable that long before this the bustard would have been extirpated, but for its peculiar manner of feeding. It inhabits only the open and extensive plain, where its food lies in abundance, and where every invader may be seen at a distance.

The bustard is much larger than the turkey, the male generally weighing from twenty-five to twenty-seven pounds. The neck is a foot long, and the legs a foot and a half. The wings are not proportionable to the rest of the body, being but four feet from the tip of one to the other; for which reason the bird flies with great difficulty. The head and neck of the male are ash-coloured; the back is barred transversely with black, bright, and rust colour. The greater quill feathers are black; the belly white; and the tail, which consists of twenty feathers, is marked with broad black bars.

The bustards are frequently seen in flocks of fifty or more, in the extensive downs of Salisbury Plain, in the heaths of Sussex and Cambridgeshire, the Dorsetshire uplands, and as far as East Lothian in Scotland. In those extensive plains, where there are no woods to screen the sportsman, nor hedges to creep along, the bustards enjoy an indolent security.

Their

Their food is composed of the berries that grow among the heath, and the large earth-worms that appear in great quantities on the downs before sun-rising in summer. It is in vain that the fowler creeps forward to approach them, they have always centinels placed at proper eminences, which are ever on the watch, and warn the flock of the smallest appearance of danger. All therefore that is left the sportsman, is the comfortless view of their distant security. He may wish, but they are in safety.

It sometimes happens that these birds, though they are seldom shot by the gun, are run down by grey-hounds. As they are voracious and greedy, they often sacrifice their safety to their appetite, and feed themselves so very fat, that they are unable to fly without great preparation. When the grey-hound, therefore, comes within a certain distance, the bustard runs off flapping its wings, and endeavouring to gather air enough under them to rise; in the mean time, the enemy approaches nearer and nearer, till it is too late for the bird even to think of obtaining safety by flight; for just at the rise there is always time lost, and of this the bird is sensible; it continues, therefore, on the foot until it has got a sufficient way before the dog for flight, or until it is taken.

As there are few places where they can at once find proper food and security, so they generally continue near their old haunts, seldom wandering above twenty or thirty miles from home. As their food is replete with moisture, it enables them to live upon these dry plains, where there are scarcely any springs of water, a long time without drinking. Besides this, Nature has given the males an admirable magazine for their security against thirst. This is a pouch, the entrance of which lies immediately under the tongue, and capable of holding near seven quarts of water. This is probably filled upon proper occasions, to supply the hen when sitting, or the young before they can fly.

They make their nests upon the ground, only just scraping a hole in the earth, and sometimes lining it with a little long grass or straw. There they lay two eggs only, almost of the size of a goose-egg, of a pale olive brown, marked with spots of a darker colour. They hatch for about five weeks, and the young ones run about as soon as they are out of the shell.

THE COCK of the wood, the BLACK COCK, the GROUS, and the PTARMIGAN—Are all birds of a similar nature, and chiefly found in heathy mountains and piny forests, at a distance

distance from mankind. They might once indeed have been common enough over all England, when a great part of the country was covered with heath; but at present their numbers are thinned: the two first of this kind are utterly unknown in the south, and have taken refuge in the northern parts of Scotland, where the extensive heaths afford them security, and the forests shelter.

The cock of the wood is sometimes of the size of a turkey, and often weighs near fourteen pounds; the black cock, of which the male is all over black, though the female is of the colour of a partridge, is about the size of a hen, and, like the former is only found with us in the Highlands of Scotland; the grouse is about half as large again as a partridge, and its colour much like that of a wood-cock, but redder; the ptarmigan is still somewhat less, and is of a pale brown or ash colour. They are all distinguishable from other birds of the poultry kind, by a naked skin, of a scarlet colour, above the eyes, in the place and of the figure of eye-brows.

The *cock* of the *wood*, when in the forest, attaches himself principally to the oak and the pine tree; the cones of the latter serving for his food, and the thick boughs for an habitation. He feeds also upon ants eggs, which seem a high delicacy to all birds of the poultry kind: cranberries are likewise often found in his crop. The female is much less than her mate, and entirely unlike him in plumage, so that she might be mistaken for a bird of another species: she seldom lays more than six or seven eggs, which are white, and marked with yellow, of the size of a common hen's egg: she generally lays them in a dry place and a mossy ground; and when she is obliged, during the time of incubation, to leave her eggs in quest of food, she covers them up so artfully, with moss or dry leaves, that it is extremely difficult to discover them.

As soon as the young ones are hatched, they are seen running with extreme agility after the mother, though sometimes they are not entirely disengaged from the shell. They soon come to perfection: they are an hardy bird, their food lies every where before them, and it would seem that they should encrease in great abundance. But this is not the case; their numbers are thinned by rapacious birds and beasts of every kind; and still more by their own salacious contests. They fight each other, like game cocks; and are so inattentive to their own safety, that it often happens that two or three of them are killed at a shot. It is probable, that in these contests, the bird which comes off victorious takes

takes possession of the female seraglio, as it is certain they have no faithful attachments.

OF PARTRIDGES there are two kinds; the grey and the red. The red partridge is the largest of the two, and often perches upon trees; the grey, with which we are best acquainted in England, is most prolific, and always keeps on the ground.

The partridge seems to be a bird well known all over the world, as it is found in every country, and in every climate; as well in the frozen regions about the pole, as the torrid tracts under the equator. It even seems to adapt itself to the nature of the climate where it resides. In Greenland, the partridge, which is brown in summer, as soon as the icy winter sets in, begins to take a covering suited to the season: it is then clothed with a warm down beneath; and its outward plumage assumes the colour of the snows amongst which it seeks its food. The manners of the partridge in most circumstances, resemble all those of poultry in general; but their cunning and instinct seems superior to those of the larger kinds. Perhaps, as they live in the very neighbourhood of their enemies, they have more frequent occasion to put their little arts in practice; and learn, by habit, the means of evasion or safety. Whenever, therefore, a dog or other formidable animal approaches their nest, the female uses every means to draw him away. She keeps just before him, pretends to be incapable of flying, just hops up, and then falls down before him, but never goes off so far as to discourage her pursuer. At length, when she has drawn him entirely away from her secret treasure, she at once takes wing, and fairly leaves him to gaze after her in despair.

After the danger is over, and the dog withdrawn, she then calls her young who assemble at once at her cry, and follow where she leads them. There are generally from ten to fifteen in a covey; and, if unmolested, they live from fifteen to seventeen years.

THE QUAIL is a bird much smaller than any of the former, being not above half the size of a partridge. The feathers of the head are black, edged with rusty brown; the breast is of a pale yellowish red, spotted with black; the feathers on the back are marked with lines of pale yellow, and the legs are of a pale hue.

The quail is by all known to be a bird of passage; and yet if we consider its heavy manner of flying, and its dearth of plumage, with respect to its corpulence, we shall be sur-

prised how a bird so apparently ill qualified for migration, should take such extensive journeys. Nothing however is more certain. “When we sailed from Rhodes to Alexandria,” says Bellonius, “about autumn, many quails, flying from the north to the south, were taken in our ship; and sailing at spring-time the contrary way, from the south to the north, I observed them on their return, when many of them were taken in the same manner.” This account is confirmed by many others; who aver, that they choose a north wind for these adventures; the south wind being very unfavourable, as it retards their flight, by moistening their plumage. They then fly two by two; continuing, when their way lies over land, to go faster by night than by day: and to fly very high, to avoid being surprised or set upon by birds of prey. It is now, however, asserted by some, that the quail only migrates from one province of a country to another. For instance, that in England, they fly from the inland counties, to those bordering on the sea, and continue there all the winter.

These birds are much less prolific than the partridge; seldom laying more than six or seven whitish eggs, marked with ragged, rust-coloured spots. Quail-fighting was a favourite amusement among the Athenians; they abstained from the flesh of this bird, deeming it unwholesome, as supposing that it fed upon the white hellebore; but they reared great numbers of them, for the pleasure of seeing them fight; and staked sums of money, as we do with regard to cocks, upon the success of the combat. Fashion, however, has at present changed with regard to this bird; we take no pleasure in its courage, but its flesh is considered as a very great delicacy.

C H A P. XXV.

Of Birds of the Pie Species.—The Raven.—The Crow.—The Magpie.—The Roller.—The Toucan.—The Woodpecker.—The Bird of Paradise.—The Cuckoo.—The Parrot, Mackaw, Parakeet, &c.—The Pigeon.

THE RAVEN, the CARRION-CROW, and the ROOK, are birds so well known, that a long description would but obscure our ideas of them. The raven is the largest of the three, and distinguished from the rest not only by his size, but by his bill being somewhat more hooked than that of the rest.

rest. As for the carrion-crow and the rook, they so strongly resemble each other, both in make and size, that they are not easily distinguished asunder. The chief difference to be found between them lies in the bill of the rook; which, by frequently being thrust into the ground to fetch out grubs and earth-worms, is bare of feathers as far as the eyes, and appears of a whitish colour. It differs also in the purple splendour or gloss of its feathers, which in the carrion-crow are of a more dirty-black. Nor is it amiss to make these distinctions, as the rook has but too frequently suffered for its similitude to the carrion-crow; and thus an harmless bird, that feeds only upon insects and corn, has been destroyed for another that feeds upon carrion, and is often destructive among young poultry.

The *raven* is a bird found in every region of the world; strong and hardy, he is uninfluenced by the changes of the weather; and when other birds seem numbed with cold, or pining with famine, the raven is active and healthy, busily employed in prowling for prey, or sporting in the coldest atmosphere. As the heats at the line do not oppress him, so he bears the cold of the polar countries with equal indifference. He is sometimes indeed seen milk white, and this may probably be the effect of the rigorous climates of the north. A raven may be reclaimed to almost every purpose to which birds can be converted. He may be trained up for fowling like an hawk; he may be taught to fetch and carry like a spaniel; he may be taught to speak like a parrot; but the most extraordinary of all is, that he can be taught to sing like a man. I have heard a raven sing the Black Joke with great distinctness, truth, and humour.

Indeed, when the raven is taken as a domestic, he has many qualities that render him extremely amusing. Busy, inquisitive, and impudent, he goes every where, affronts and drives off the dogs, plays his pranks on the poultry, and is particularly assiduous in cultivating the good will of the cook maid, who seems to be the favourite of the family. But then, with the amusing qualities of a favourite, he often also has the vices and defects. He is a glutton by nature, and a thief by habit. He does not confine himself to petty depredations on the pantry or the larder; he soars at more magnificent plunder; at spoils which he can neither exhibit nor enjoy; but which, like a miser, he rests satisfied with having the satisfaction of sometimes visiting and contemplating in secret. A piece of money, a tea-spoon, or a ring, are always tempting baits to his avarice; these he will sily

seize upon, and, if not watched, will carry to his favourite hole.

In his wild state, the raven is an active and greedy plunderer. Nothing comes amiss to him. If in his flights he perceives no hopes of carrion, and his scent is so exquisite, that he can smell it at a vast distance; he then contents himself with more unsavory food, fruits, insects, and the accidental desert of a dunghill. This bird chiefly builds its nest in trees, and lays five or six eggs of a pale green colour, marked with small brownish spots.

Notwithstanding the injury these birds do in picking out the eyes of sheep and lambs, when they find them sick and helpless, a vulgar respect is paid them as being the birds that fed the prophet Elijah in the wilderness. This prepossession in favour of the raven is of very antient date, as the Romans themselves, who thought the bird ominous, paid it, from motives of fear, the most profound veneration. One of these that had been kept in the temple of Castor, as Pliny informs us, flew down into the shop of a taylor, who took much delight in the visits of his new acquaintance. He taught the bird several tricks; but particularly to pronounce the name of the emperor Tiberius and the whole royal family. The taylor was beginning to grow rich by those who came to see this wonderful raven, till an envious neighbour, displeased at the taylor's success, killed the bird, and deprived the taylor of his future hopes of fortune. The Romans, however, took the poor taylor's part; they punished the man who offered the injury, and gave the raven all the honours of a magnificent interment.

Birds in general live longer than quadrupeds; and the raven is said to be one of the most long-lived of the number. Some of them have been known to live near an hundred years. This animal, indeed, seems possessed of those qualities that generally produce longevity, a good appetite, and great exercise.

The *carrion-crow* resembles the raven in its appetites, its laying, and manner of bringing up its young. It only differs in being less bold, less docile, and less favoured by mankind.

The *rook* leads the way in another, but a more harmless train, that have no carnivorous appetites, but only feed upon insects and corn. The *Royston crow* is about the size of the two former. The breast, belly, back, and upper part of the neck, being of a pale ash-colour; the head and wings glossed over with a fine blue. He is a bird of passage, visiting

visiting this kingdom in the beginning of winter, and leaving it in the spring. He breeds, however, in different parts of the British dominions; and his nest is common enough in trees in Ireland. The jack-daw is black, like all the former, but ash-coloured on the breast and belly. He is not above the size of a pigeon. He is docile and loquacious. His head being large for the size of his body, which, as has been remarked, argues him ingenious and crafty. He builds in steeples, old castles, and high rocks, laying five or six eggs in a season. The Cornish chough is like a jack-daw, but larger, and almost the size of a crow. The feet and legs are long like those of a jack-daw, but of a red colour; and the plumage is black all over. It frequents rocks, old castles, and churches, by the sea-side, like the daw; and with the same noisy assiduity. It is only seen along the western coasts of England. These are birds very similar in their manners, feeding on grain and insects, living in society, and often suffering general castigation from the flock for the good of the community.

To this tribe of the crow-kind, some foreign sorts might be added: I will take notice only of one, which, from the extraordinary size and fashion of its bill, must not be passed in silence. This is the *Calao*, or horned Indian raven, which exceeds the common raven in size, and habits of depredation. But what he differs in from all other birds is the beak, which, by its length and curvature at the end, appears designed for rapine, but then it has a kind of horn standing out from the top, which looks somewhat like a second bill, and gives this bird, otherwise fierce and deformed, a very formidable appearance. The horn springs out of the forehead, and grows to the upper part of the bill, being of great bulk; so that near the forehead it is four inches broad, not unlike the horn of the rhinoceros, but more crooked at the tip. In such of those birds as come from different parts of Africa, the body is proportionable to the beak; in such as come from the Molucca Islands, the beak bears no proportion to the body.

THE MAGPIE is too well known to need a description. Indeed, were its other accomplishments equal to its beauty, few birds could be put in competition. Its black, its white, its green and purple, with the rich and gilded combination of the glosses on its tail, are as fine as any that adorn the most beautiful of the feathered tribe. But it has too many of the qualities of a beau, to depreciate these na-

tural perfections : vain, restless, loud, and quarrelsome, it is an unwelcome intruder every where ; and never misses an opportunity, when it finds one, of doing mischief.

The magpie bears a great resemblance to the butcher-bird in its bill, which has a sharp process near the end of the upper chap, as well as in the shortness of its wings, and the form of the tail, each feather shortening from the two middlemost. But it agrees still more in its food, living not only upon worms and insects, but also upon small birds, when they can be seized. A wounded lark, or a young chicken separated from the hen, are sure plunder ; and the magpie will even sometimes set upon and strike a black-bird.

The same insolence prompts it to teize the largest animals when its insults can be offered with security. They often are seen perched upon the back of an ox or a sheep, pecking up the insects to be found there, chattering and tormenting the poor animal at the same time, and stretching out their necks for combat, if the beast turns its head backward to reprehend them. They seek out also the nests of birds ; and, if the parent escapes, the eggs make up for the deficiency : the thrush and the black-bird are but too frequently robbed by this assassin, and this in some measure causes their scarcity.

No food seems to come amiss to this bird ; it shares with ravens in their carrion, with rooks in their grain, and with the cuckoo in birds eggs : but it seems possessed of a providence seldom usual with gluttons : for when it is satisfied for the present, it lays up the remainder of the feast for another occasion. It will even in a tame state hide its food when it has done eating, and after a time return to the secret hoard with renewed appetite and vociferation.

In all its habits it discovers a degree of instinct unusual to other birds. Its nest is not less remarkable for the manner in which it is composed than for the place the magpie takes to build it in. The nest is usually placed conspicuous enough, either in the middle of some hawthorn bush, or on the top of some high tree. The place, however, is always found difficult of access ; for the tree pitched upon usually grows in some thick hedge-row, fenced by brambles at the root ; or sometimes one of the higher bushes is fixed upon for the purpose. When the place is thus chosen as inaccessible as possible to men, the next care is to fence the nest above, so as to defend it from all the various enemies of air. The kite, the crow, and the sparrow-hawk, are to be guarded

guarded against; as their nests have been sometimes plundered by the magpie, so it is reasonably feared that they will take the first opportunity to retaliate. To prevent this, the magpie's nest is built with surprising labour and ingenuity.

The body of the nest is composed of hawthorn branches; the thorns sticking outward, but well united together by their mutual insertions. Within it is lined with fibrous roots, wool, and long grass, and then nicely plaistered all round with mud and clay. The body of the nest being thus made firm and commodious, the next work is to make the canopy which is to defend it above. This is composed of the sharpest thorns, woven together in such a manner as to deny all entrance except at the door, which is just large enough to permit egress and regress to the owners. In this fortress the male and female hatch and bring up their brood with security, sheltered from all attacks but those of the climbing school-boy, who often finds his torn and bloody hands too dear a price for the eggs or the young ones. The magpie lays six or seven eggs, of a pale green colour, spotted with brown.

This bird, in its domestic state, preserves its natural character with strict propriety. The same noisy, mischievous habits attend it to the cage that marked it in the woods; and being more cunning, so it is also a more docile bird than any other taken into keeping. Those who are desirous of teaching it to speak, have a foolish custom of cutting its tongue, which only puts the poor animal to pain, without improving its speech in the smallest degree. Its speaking is sometimes very distinct; but its sounds are too thin and sharp to be an exact imitation of the human voice, which the hoarse raven and parrot can counterfeit more exactly.

To this tribe we may refer the JAY, which is one of the most beautiful of the British birds. The forehead is white, streaked with black; the head is covered with very long feathers, which it can erect into a crest at pleasure; the whole neck, back, breast, and belly, are of a faint purple, dashed with grey; the wings are most beautifully barred with a lovely blue, black, and white; the tail is black, and the feet of a pale brown. Like the magpie, it feeds upon fruits, will kill small birds, and is extremely docile.

THE CHATTERER also, which is a native of Germany, may be placed in this rank; and is somewhat less than the

former. It is variegated with a beautiful mixture of colours; red, ash-colour, chefnut, and yellow.

THE ROLLER is not less beautiful than any of the former. The breast and belly are blue; the head green; and the wings variegated with blue, black, and white. But it may be distinguished from all others by a sort of naked tubercles or warts near the eyes, which still farther contribute to encrease its beauty.

To this class may be added a numerous list from all the tropical forests of the east and west; I will fix only upon one, the TOUCAN, a bird of the pie kind, whose bill is nearly as large as the rest of its whole body.

Of this extraordinary bird there are four or five varieties. I shall only describe the red-beaked toucan. It is about the size of, and shaped like a jack-daw, with a large head to support its monstrous bill: this bill, from the angles of the mouth to its point, is six inches and an half; and its breadth, in the thickest part, is a little more than two. Its thickness near the head, is one inch and a quarter; and it is a little rounded along the top of the upper chap, the under side being round also; the whole of the bill extremely slight, and a little thicker than parchment. The upper chap is of a bright yellow, except on each side, which is of a fine scarlet colour; as is also the lower chap, except at the base, which is purple. Between the head and the bill there is a black line of separation all round the base of the bill; in the upper part of which the nostrils are placed, and are almost covered with feathers; which has occasioned some writers to say, that the toucan has no nostrils. Round the eyes, on each side of the head, is a space of bluish skin, void of feathers, above which the head is black, except a white spot on each side joining to the base of the upper chap. The hinder part of the neck, the back, wings, tail, belly, and thighs, are black. The under side of the head, throat, and the beginning of the breast, are white. Between the white on the breast, and the black on the belly, is a space of red feathers, in the form of a new moon, with its horns upwards. The legs, feet and claws, are of an ash-colour; and the toes stand like those of parrots, two before, and two behind.

It is reported, by travellers, that this bird, though furnished with so formidable a beak, is harmless and gentle, being

being so easily made tame, as to sit and hatch its young in houses. It feeds chiefly upon pepper, which it devours very greedily, gorging itself in such a manner, that it voids it crude and uncooked. This, however, is no objection to the natives from using it again; they even prefer it before that pepper which is fresh gathered from the tree: and seem persuaded that the strength and heat of the pepper is qualified by the bird, and that all its noxious qualities are thus exhausted.

This bird is only found in the warm climates of South America, where it is in great request, both for the delicacy of its flesh, which is tender and nourishing, and for the beauty of its plumage, particularly the feathers of the breast. The skin of this part the Indians pluck off, and when dry, glue to their cheeks; and this they consider as an irresistible addition to their beauty.

THE WOODPECKERS.] These birds live chiefly upon the insects contained in the body of trees; and for this purpose are furnished with a straight, hard, strong, angular and sharp bill, made for piercing and boring. They have a tongue of a very great length; round, ending in a sharp, stiff, bony thorn, dentated on each side, to strike ants and insects when dislodged from their cells. Their legs are short and strong, for the purposes of climbing. Their toes stand two forward, and two backward; which is particularly serviceable in holding by branches of trees. They have hard stiff tails, to lean upon when climbing. They feed only upon insects, and want that intestine, which anatomists call the *cæcum*; a circumstance peculiar to this tribe only.

Of this bird there are many kinds, and many varieties in each kind. They form large colonies in the forests of every part of the world. They differ in size, colour, and appearance; and agree only in the marks above-mentioned, or in those habits which result from so peculiar a conformation. Instead, therefore, of descending into a minute discrimination of every species, let us take one for a pattern. The Green Wood-spice or Wood-pecker is called the Rain Fowl in some parts of the country; because, when it makes a greater noise than ordinary, it is supposed to foretell rain. It is about the size of a jay; the throat, breast and belly are of a pale greenish colour; and the back, neck and covert feathers of the wings are green. But the tongue makes its most distinguished characteristic, as it serves for its support and

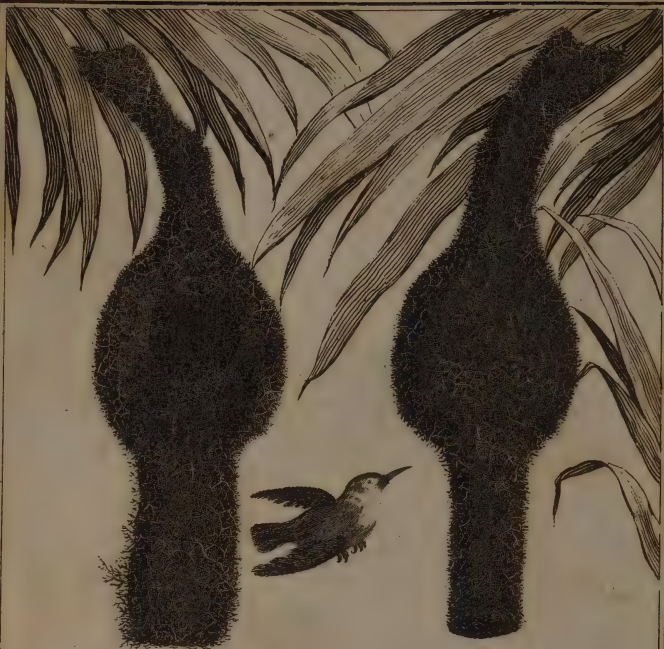
and defence. As was said above, the wood-pecker feeds upon insects; and particularly on those which are lodged in the body of hollow or of rotting trees. The tongue is its instrument for killing and procuring this food; which cannot be found in great plenty. This is round, ending in a stiff, sharp, bony tip, dentated on both sides, like the beard of an arrow; and this it can dart out three or four inches from the bill, and draw in again at pleasure. Its prey is thus transfixed, and drawn into the bill, which, when swallowed, the dart is again launched at fresh game.

The wood-pecker, however, does not confine its depredations solely to trees, but sometimes lights upon the ground, to try its fortune at an ant-hill. The wood-pecker first goes to their hills, which it pecks, in order to call them abroad; it then thrusts out its long red tongue, which being like a worm, and resembling their usual prey, the ants come out to settle upon in great numbers; however, the bird watching the properest opportunity, withdraws its tongue at a jerk, and devours the devourers. This stratagem it continues till it has alarmed their fears; or till it is quite satisfied.

As the wood-pecker is obliged to make holes in trees to procure food, so is it also to make cavities still larger to form its nest and to lay in. This is performed, as usual, with the bill; although some have affirmed that the animal uses its tongue, as a gimblet, to bore with. But this is a mistake; and those that are curious, may often hear the noise of the bill making its way in large woods and forests. The wood-pecker chooses, however, for this purpose, trees that are decayed, or wood that is soft, like beech, elm and poplar. In these, with very little trouble, it can make holes as exactly round as a mathematician could with compasses. One of these holes the bird generally chuses for its own use, to nestle, and bring up its young in: but as they are easily made, it is delicate in its choice, and often makes twenty before one is found fit to give entire satisfaction.

The wood-pecker takes no care to line its nest with feathers or straw; its eggs are deposited in the hole, without any thing to keep them warm, except the heat of the parent's body. Their number is generally five or six; always white, oblong, and of a middle size. When the young are excluded, and before they leave the nest, they are adorned with a scarlet plumage under the throat, which adds to their beauty.

In



*Tropical Birds of the Woodpecker Species,
and their manner of building their Nests. p. 379*



In Guinea and Brasil, the birds of this species take a different method to protect and hatch their nascent progeny. A traveller who walks into the forests of those countries, among the first strange objects that excite curiosity, is struck with the multitude of birds nests hanging at the extremity of almost every branch. Many other kind of birds build in this manner; but the chief of them are of the wood-pecker kind. In cultivated countries, a great part of the caution of the feathered tribe is to hide or defend their nests from the invasions of man, as he is their most dreaded enemy. But in the depth of those remote and solitary forests, where man is but seldom seen, if the monkey or the snake can be guarded against, the bird has no other enemies to fear. On the bananas and plantanes of these regions, is seen the most various, and the most inimical assemblage of creatures that can be imagined. The top is inhabited by monkies of some particular tribe, that drive off all others; lower down about the great trunk numbers of the larger snakes are found patiently waiting till some unwary animal comes within the sphere of their activity; and at the edges of the tree hang these artificial nests, in great abundance, inhabited by birds of the most delightful plumage.

The nest is usually formed in this manner: when the time of incubation approaches, they fly busily about, in quest of a kind of moss, called, by the English inhabitants of those countries, *old man's beard*. It is a fibrous substance, and not very unlike hair, which bears being moulded into any form, and suffers being glued together. This, therefore, the little wood-pecker, called by the natives of Brasil, the *Guiratemga*, first glues by some viscous substance, gathered in the forest, to the extremest branch of a tree; then building downward, and still adding fresh materials to those already procured, a nest is formed, that depends, like a pouch, from the point of the branch: the hole to enter at, is on the side; and all the interior parts are lined with the finer fibres of the same substance, which compose the whole.

Such is the general contrivance of these hanging nests; which are made, by some other birds, with still superior art. A little bird of the Grosbeak kind, in the Philippine islands, makes its nest in such a manner, that there is no opening but from the bottom. At the bottom the bird enters, and goes up through a funnel, like a chimney, till it comes to the real door of the nest, which lies on one side, and only opens into this funnel.

OF THE BIRD OF PARADISE.] There are two kinds of the Bird of Paradise; one about the size of a pigeon, which is more common; the other not much larger than a lark, which has been described more imperfectly.

The larger of these birds appears to the eye of the size nearly of a pigeon, though in reality the body is not much greater than that of a thrush. The tail, which is about six inches, is as long as the body; the wings are large compared with the bird's other dimensions. The head, the throat and the neck are of a pale gold colour. The base of the bill is surrounded by black feathers, as also the side of the head and throat, as soft as velvet, and changeable like those on the neck of a mallard. The hinder part of the head is of a shining green, mixed with gold. The body and wings are chiefly covered with beautiful brown, purple and gold feathers. The uppermost part of the tail feathers are of a pale yellow, and those under them white and longer than the former; for which reason the hinder part of the tail appears to be all white. But what chiefly excites curiosity are, two long naked feathers, which spring from the upper part of the rump above the tail, and which are usually about three feet long. These are bearded only at the beginning and the end; the whole shaft for above two feet nine inches being of a deep black, while the feathered extremity is of a changeable colour, like the mallard's neck.

This bird, which for beauty exceeds all others of the pie kind, is a native of the Molucca Islands, but found in greatest numbers in that of Aro. The inhabitants are not insensible of the pleasure they afford, and give them the name of God's birds, as being superior to all others that he has made. They live in large flocks, and at night generally perch upon the same tree. They are called by some, the Swallows of Ternate, from their rapid flight, and from their being continually on the wing in pursuit of insects, their usual prey.

As the country where they are bred has its tempestuous season, when rains and thunders continually disturb the atmosphere, these birds are then but seldom seen. The natives, who make a trade of killing and selling these birds to the Europeans, generally conceal themselves in the trees where they resort, and having covered themselves up from sight in a bower made of the branches, they shoot at the birds with reedy arrows; and, as they assert, if they happen to kill the king, they then have a good chance for killing the greatest



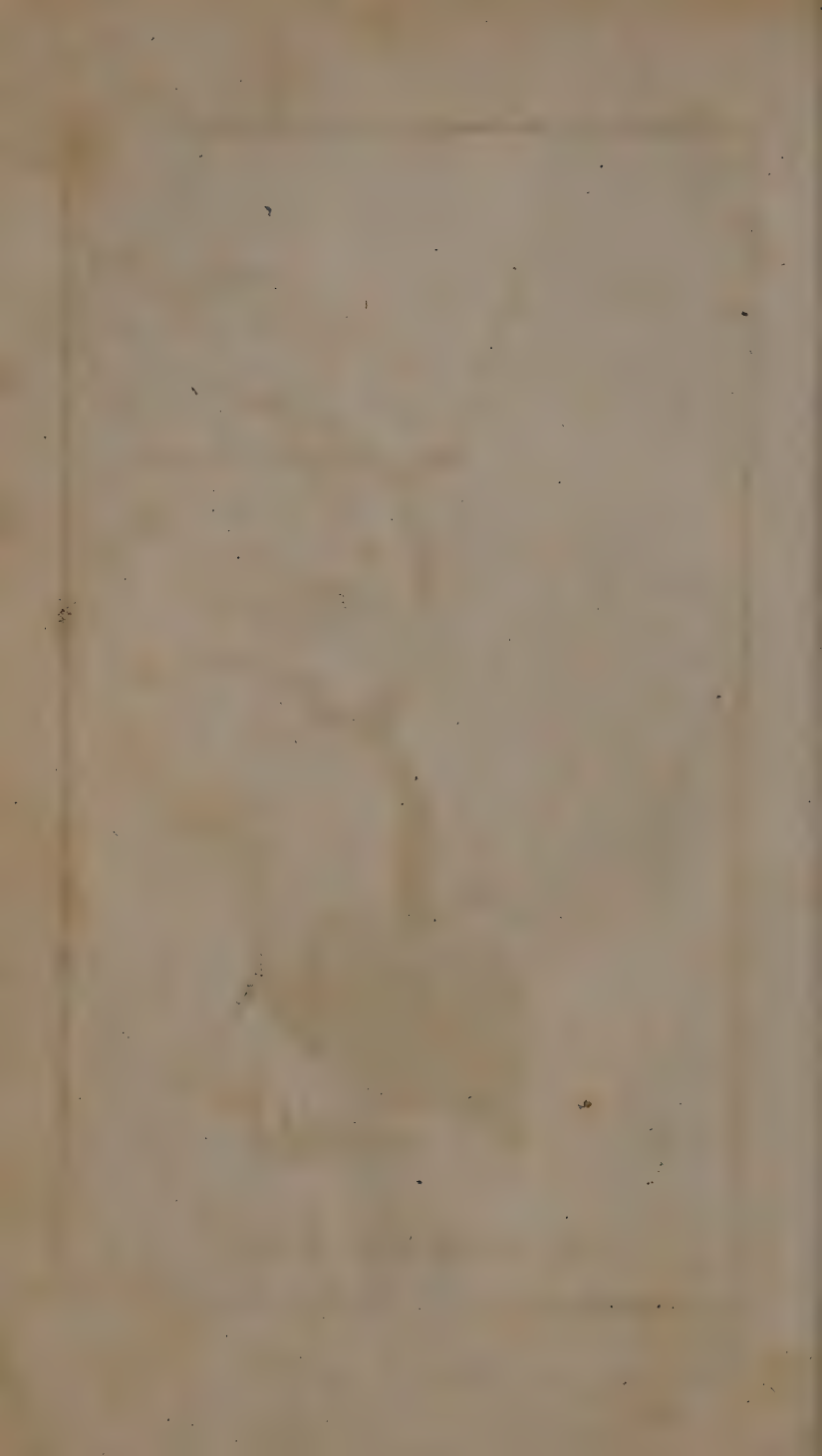
Bird of Paradise

p. 380

Ditto



The Guinea Fowl p. 365



greatest part of the flock. The chief mark by which they know the king is by the ends of the feathers in his tail, which have eyes like those of a peacock. When they have taken a number of these birds, their usual method is to gut them and cut off their legs; they then run a hot iron into the body, which dries up the internal moisture; and filling the cavity with salts and spices, they sell them to the Europeans for a perfect trifle.

THE CUCKOO.] This singular bird, which is somewhat less than a pigeon, shaped like a magpie, and of a greyish colour, is distinguished from all other birds, by its round prominent nostrils. Having disappeared all the winter, it discovers itself in our country early in the spring, by its well known call. Its note is heard earlier or later as the season seems to be more or less forward, and the weather more or less inviting. From the cheerful voice of this bird the farmer may be instructed in the real advancement of the year. His note is pleasant though uniform; and, from an association of ideas, seldom occurs to the memory without reminding us of the sweets of summer.

The female cuckoo makes no nest of her own. She repairs for that purpose to the nest of some other bird, generally the water-wagtail or hedge-sparrow, and having devoured the eggs of the owner, lays her own in their place. She usually lays but one, which is speckled, and of the size of a blackbird's. This the fond foolish bird hatches with great assiduity, and, when excluded, finds no difference in the great ill-looking changeling from her own. To supply this voracious creature, the credulous nurse toils with unusual labour, no way sensible that she is feeding up an enemy to her race, and one of the most destructive robbers of her future progeny.

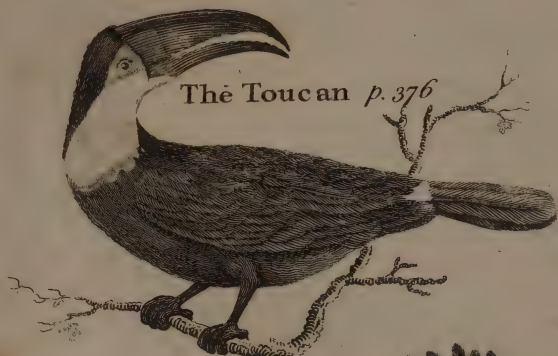
It was once doubted, whether these birds were carnivorous; but Reaumur was at the pains of breeding up several, and found that they would not feed upon bread or corn; but flesh and insects were their favourite nourishment. Their gluttony is not to be wondered at, when we consider the capacity of their stomach, which is enormous, and reaches from the breast-bone to the vent.

The cuckoo when fledged and fitted for flight, follows its supposed parent but for a little time; its appetites for insect food encreasing, as it finds no great chance for a supply in imitating its little instructor, it parts good friends, the step-child seldom offering any violence to its nurse. Nevertheless,

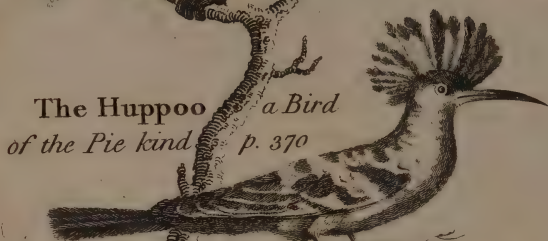
vertheless, all the little birds of the grove seem to consider the young cuckoo as an enemy, and revenge the cause of their kind by their repeated insults. They pursue it wherever it flies, and oblige it to take shelter in the thickest branches of some neighbouring tree. All the smaller birds form the train of its pursuers; but the wry-neck, in particular, is found the most active in the chase; and thence it has been called by many the cuckoo's attendant and provider. But it is very far from following with a friendly intention; it only pursues as an insulter, or a spy, to warn all its little companions of the cuckoo's depredations.

Such are the manners of this bird while it continues to reside, or to be seen amongst us. But early, at the approach of winter, it totally disappears, and its passage can be traced to no other country. Some suppose that it lies hid in hollow trees; and others that it passes into warmer climates. Which of these opinions is true is very uncertain, as there are no facts related on either side that can be totally relied on. To support the opinion that they remain torpid during the winter, at home, Willoughby introduces the following story, which he delivers upon the credit of another. "The servants of a gentleman, in the country, having stocked up, in one of their meadows, some old dry rotten willows, thought proper, on a certain occasion, to carry them home. In heating a stove, two logs of this timber were put into the furnace beneath, and fire applied as usual. But soon, to the great surprise of the family, was heard the voice of a cuckoo, singing three times from under the stove. Wondering at so extraordinary a cry in winter time, the servants ran and drew the willow logs from the furnace, and in the midst, one of them saw something move: wherefore, taking an ax, they opened the hole, and thrusting in their hands, first they plucked out nothing but feathers; afterwards they got hold of a living animal; and this was the cuckoo that had waked so very opportunely for its own safety. It was, indeed," continues our historian, brisk and lively, but wholly naked and bare of feathers, and without any winter provision in its hole. This cuckoo the boys kept two years afterwards alive in the stove; but whether it repaid them with a second song, the author of the tale has not thought fit to inform us."

The most probable opinion on this subject is, that as quails and woodcocks shift their habitations in winter, so also does the cuckoo; but to what country it retires, or whether



The Toucan p. 376



The Huppoo a Bird
of the Pie kind p. 370



The Cockatoo a variety of the Parrot Species p 383

whether it has been ever seen on its journey, are questions that I am wholly incapable of resolving.

Of this bird there are many kinds in various parts of the world, not only differing in their colours but their size. Brisson makes not less than twenty-eight sorts of them; but what analogy they bear to our English cuckoo I will not take upon me to determine.

The PARROT is the best known among us of all foreign birds, as it unites the greatest beauty with the greatest docility.

The ease with which this bird is taught to speak, and the great number of words which it is capable of repeating, are no less surprising. We are assured, by a grave writer, that one of these was taught to repeat a whole sonnet from Petrarch; and that I may not be wanting in my instance, I have seen a parrot, belonging to a distiller, who had suffered pretty largely in his circumstances from an informer who lived opposite him, very ridiculously employed. This bird was taught to pronounce the ninth commandment, *Thou shalt not bear false witness against thy neighbour*, with a very clear, loud, articulate voice. The bird was generally placed in its cage over against the informer's house, and delighted the whole neighbourhood with its persevering exhortations.

Willoughby tells a story of a parrot, which is not so dull as those usually brought up when this bird's facility of talking happens to be the subject. "A parrot belonging to king Henry the Seventh, who then resided at Westminster, in his palace by the river Thames, had learned to talk many words from the passengers as they happened to take water. One day, sporting on its perch, the poor bird fell into the water, at the same time crying out, as loud as he could, *A boat, twenty pound for a boat*. A waterman, who happened to be near, hearing the cry, made to the place where the parrot was floating, and taking him up, restored him to the king. As it seems the bird was a favourite, the man insisted that he ought to have a reward rather equal to his services than his trouble; and, as the parrot had cried twenty pounds, he said the king was bound in honour to grant it. The king at last agreed to leave it to the parrot's own determination, which the bird hearing, cried out, *Give the knave a groat*."

Those who usually bring these birds over are content to make three or four distinctions. The large kind, which are of the size of a raven, are called Maccaws; the next size
are

are simply called Parrots; those which are entirely white are called Lories; and the lesser size of all are called Parakeets. The difference between even these is rather in the size than in any other peculiar conformation, as they are all formed alike, having toes two before and two behind for climbing and holding; strong hooked bills for breaking open nuts, and other hard substances, on which they feed; and loud harsh voices, by which they fill their native woods with clamour.

The bill is fashioned with peculiarities; for the upper chap, as well as the lower, are both moveable. In most other birds the upper chap is connected, and makes but one piece with the skull; but in these, and in one or two species of the feathered tribe more, the upper chap is connected to the bone of the head by a strong membrane, placed on each side, that lifts and depresses it at pleasure. By this contrivance they can open their bills the wider; which is not a little useful, as the upper chap is so hooked and so overhanging, that, if the lower chap only had motion, they could scarcely gape sufficiently to take any thing in for their nourishment.

The tongue of this bird somewhat resembles that of a man; for which reason, some pretend that it is so well qualified to imitate the human speech; but the organs by which these sounds are articulated lie farther down in the throat, being performed by the great motion which the os hyoides has in these birds above others.

The parrot, though common enough in Europe, will not, however, breed here. The climate is too cold for its warm constitution; and though it bears our winter when arrived at maturity, yet it always seems sensible of its rigour, and loses both its spirit and appetite during the colder part of the season.

This sagacity, which parrots shew in a domestic state, seems also natural to them in their native residence among the woods. They live together in flocks, and mutually assist each other against other animals, either by their courage or their notes of warning. They generally breed in hollow trees, where they make a round hole, and do not line their nest within. If they find any part of a tree beginning to rot from the breaking off of a branch, or any such accident, this they take care to scoop, and to make the hole sufficiently wide and convenient; but it sometimes happens that they are content with the hole which a wood-pecker has wrought out with greater ease before them; and in this they prepare to hatch and bring up their young.

They

They lay two or three eggs; and probably the smaller kind may lay more; for it is a rule that universally holds through nature, that the smallest animals are always the most prolific.

It is not for the sake of their conversation alone that the parrot is sought after among the savages; for, though some of them are but tough and ill-tasted, yet there are other sorts, particularly of the small parakeet tribe, that are very delicate food. The seed of the cotton-tree intoxicates them in the same manner as wine does man; and even wine itself is drunk by parrots, by which they are thus rendered more talkative and amusing. But of all food, they are fondest of the carthamus, or bastard saffron; which, though strongly purgative to man, agrees perfectly with their constitution, and fattens them in a very short time.

The parakeet kind in Brasil are most beautiful in their plumage, and the most talkative birds in nature. They are very tame, and appear fond of mankind; they seem pleased with holding parley with him; and while he continues to talk, answer him, and appear resolved to have the last word. The fowler walks into the woods, where they keep in abundance; but as they are green, and exactly the colour of the leaves among which they sit, he only hears their prattle, without being able to see a single bird; he looks round him, sensible that his game is within gun-shot in abundance, but is mortified to the last degree that it is impossible to see them. Unfortunately for these, however, as soon as they have stripped the tree on which they sat of all its berries, some one of them flies off to another; and, if that be found fit for the purpose, it gives a loud call, which all the rest resort to. That is the opportunity the fowler has long been waiting for, he fires in among the flock while they are yet on the wing; and he seldom fails of bringing down a part of them. But it is singular enough to see them when they find their companions fallen. They set up a loud outcry, as if they were chiding their destroyer, and do not cease till they see him preparing for a second charge.

THE TAME PIGEON, and all its beautiful varieties, derive their origin from one species, the stock dove only, the English name, implying its being the stock or stem whence the other domestic kinds have been propagated. This bird, in its natural state, is of a deep bluish ash colour; the breast dashed with a fine changeable green and purple; its wings marked with two black bars; and the tail barred near the end with black. These are the colours of the pigeon in a

state of nature; and from these simple tints has man by art propagated a variety that words cannot describe, nor even fancy suggest. However, nature still perseveres in her great outline; and though the form, colour, and even the fecundity of these birds may be altered by art, yet their natural manners and inclinations continue still the same.

The dove-house pigeon, as is well known, breeds every month; it lays two white eggs, which most usually produce young ones of different sexes. From three or four o'clock in the evening, till nine the next day, the female sits on the eggs; she is then relieved by the male, who takes his place from ten till three, while his mate is feeding abroad. In this manner they sit alternately till the young are excluded. If, during this term, the female delays to return at the expected time, the male follows and drives her to the nest; and, should he in his turn be dilatory, she retaliates with equal severity.

The young ones when hatched require no food for the three first days, only wanting to be kept warm, which is an employment the female takes entirely upon herself. During this period, she never stirs out, except for a few minutes to take a little food. From this they are fed for eight or ten days, with corn or grain of different kinds, which the old ones gather in the fields, and keep treasured up in their crops, whence they throw it up again into the mouths of their young ones, who very greedily demand it.

So great is the produce of this bird in its domestic state, that near fifteen thousand may in the space of four years be produced from a single pair. Those pigeons which are called carriers, and are used to convey letters, are easily distinguished from all others by their eyes, which are compassed about with a broad circle of naked white skin, and by being of a dark blue or blackish colour. It is from their attachment to their native place, and particularly where they have brought up their young, that these birds are employed in several countries as the most expeditious carriers. They are first brought from the place where they were bred, and whither it is intended to send them back with information. The letter is tied under the bird's wing, and it is then let loose to return. The little animal no sooner finds itself at liberty, than its passion for its native spot directs all its motions. It is seen, upon these occasions, flying directly into the clouds to an amazing height; and then, with the greatest certainty and exactness, directing itself by some surprizing instinct towards home, which lies sometimes at many miles distance. In the space of an hour and a half they perform a journey of forty

forty miles ; which is a degree of dispatch three times greater than the fleetest quadruped can perform.

The varieties of the tame pigeon are so numerous, that it would be a vain attempt to mention them : so much is the figure and the colour of this bird under human controul, that pigeon-fanciers, by coupling a male and female of different sorts, can breed them, as they express it, to a feather. Hence we have the various names of croppers, carriers, jacobines, powters, runts, and turbits, &c. There are many species of the wild pigeon differing from the stock-dove. The ring-dove is of this number ; a good deal larger than the former, and building its nest with a few dry sticks in the boughs of trees. This seems a bird much fonder of its native freedom than the former : and attempts have been frequently made to render it domestic : but they have hitherto proved fruitless ; for though their eggs have been hatched by the tame pigeon in a dove-house, yet, as soon as they could fly, they always betook themselves to the woods where they were first produced.

The turtle-dove is a smaller, but a much slyer bird than any of the former. It may easily be distinguished from the rest by the iris of the eye, which is of a fine yellow, and by a beautiful crimson circle that encompasses the eye-lids. The fidelity of these birds is noted ; and a pair being put in a cage, if one dies the other will not survive it. The turtle dove is a bird of passage, and few or none remain in our northern climates in winter. They fly in flocks when they come to breed here in summer, and delight in open, mountainous, sandy countries. They build their nests, however, in the midst of woods.

C H A P. XXVI.

Of Birds of the Sparrow kind.—Of the Thrush and its Affinities.—The Black-bird.—The Field-fare, Red-wing and Starling.—The Mock-bird.—Of the Nightingale, and other soft-billed singing Birds.—The Red-breast.—The Lark.—The Black-cap and Wren.—Of Canary Birds, and other hard-billed singing Birds.—The Linnet, Goldfinch, &c.—Of the Swallow, the Martin, the Goat-sucker.—The Humming-bird.

WITH the THRUSH we may rank the red-wing, the field-fare, the black-bird, the ring-ouzel, and the water-ouzel.

The MISSEL-THRUSH is distinguished from all of the kind by its superior size, being much larger than any of them. It differs scarcely in any other respect from the throistle, except that the spots on the breast are larger. It builds its nest in bushes, or on the side of some tree, as all of this kind are found to do, and lays four or five eggs in a season. Its song is very fine, which it begins in spring, sitting on the summit of a high tree. It is the largest bird of all the feathered tribe that has music in its voice; the note of all greater birds being either screaming, chattering, or croaking. It feeds on insects, holly and mistletoe-berries; and sometimes sends forth a very disagreeable scream when frightened or disturbed.

The BLACK-BIRD, which in cold countries, and particularly upon the Alps, is sometimes seen all over white, is a beautiful singing-bird, which whistles all the spring and summer-time with a note at a distance the most pleasing of all the grove. It is the deepest toned warbler of the woods; but it is rather unpleasant in a cage, being loud and deafening. It lays four or five blueish eggs, in a nest usually built at the stump of some old hawthorn, well plaistered on the inside with clay, straw, and hair.

Pleasing, however, as this bird may be, the blue-bird, described by Bellonius, is in every respect far superior. This beautiful animal entirely resembles a black-bird in all but its blue colour. It lives in the highest parts of the Alps, and even there chooses the most craggy rocks and the
most

most frightful precipices for its residence. As it is rarely caught, it is in high estimation even in the countries where it breeds, but still more valuable when carried from home. It not only whistles in the most delightful manner, but speaks with an articulate distinct voice. It is so docile, and observes all things with such diligence, that, though waked at midnight by any of the family, it will speak and whistle at the word of command. Its colour, about the beginning of winter, from blue becomes black, which changes to its original hue on the first approaches of spring.

The FIELD-FARE and the RED-WING make but a short stay in this country. With us they are insipid, tuneless birds, flying in flocks, and excessively watchful to preserve the general safety. All their season of music and pleasure is employed in the more northern climates, where they sing most delightfully, perched among the forests of maples, with which those countries abound. They build their nests in hedges; and lay six blueish green eggs spotted with black.

The STARE or STARLING, distinguishable from the rest of this tribe by the glossy green of its feathers, in some lights, and the purple in others, breeds in hollow trees, caves of houses, towers, ruins, cliffs, and often in high rocks over the sea. It lays four or five eggs of a pale greenish ash-colour, and makes its nest of straw, small fibres of roots, &c. Its voice is rougher than the rest of this kind; but what it wants in the melody of its note, it compensates by the facility with which it is taught to speak. In winter these birds assemble in vast flocks, and feed upon worms and insects. At the approach of spring, they assemble in fields, as if in consultation together, and for three or four days seem to take no nourishment: the greater part leave the country; the rest breed here, and bring up their young.

To this tribe might be added above an hundred other birds of nearly the thrush size, and living like them upon fruit and berries. Words could not afford variety enough to describe all the beautiful tints that adorn the foreign birds of the thrush kind. The brilliant green of the emerald, the flaming red of the ruby, the purple of the amethyst, or the bright blue of the sapphire, could not by the

most artful combination shew any thing so truly lively or delightful to the sight as the feathers of the chilcoqui or the tautotol. Passing, therefore, over these beautiful, but little known, birds, I will only mention the American **MOCK-BIRD**. It is but a plain bird to the eye, about the size of a thrush, of a white and grey colour, and a reddish bill. It is possessed not only of its own natural notes, which are musical and solemn, but it can assume the tone of every other animal in the wood, from the wolf to the raven. It seems even to sport itself in leading them astray. It will at one time allure the lesser birds with the call of their males, and then terrify them when they have come near with the screams of the eagle. The mock-bird, however, pleases most when it is most itself. At those times it usually frequents the houses of the American planters; and, sitting all night on the chimney-top, pours forth the sweetest and the most various notes of any bird whatever. It would seem, if accounts be true, that the deficiency of most other song-birds in that country is made up by this bird alone. They often build their nests in the fruit-trees about houses, and are easily rendered domestic.

THE NIGHTINGALE is not only famous among the moderns for its singing, but almost every one of the ancients who undertook to describe beautiful nature, has contributed to raise its reputation.

This most famous of the feathered tribe visits England in the beginning of April, and leaves us in August. It is found but in some of the southern parts of that country, being totally unknown in Scotland, Ireland, or North Wales. They frequent thick hedges and low coppices, and generally keep in the middle of the bush, so that they are rarely seen. They begin their song in the evening, and generally continue it for the whole night. For weeks together, if undisturbed, they sit upon the same tree; and Shakespear rightly describes the nightingale sitting nightly in the same place.

In the beginning of May, the nightingale prepares to make its nest, which is formed of the leaves of trees, straw, and moss. The nest being very eagerly sought after, is as cunningly secreted; so that but very few of them are found by the boys when they go upon these pursuits. It is built at the bottom of hedges, where the bushes are thickest and best covered. While the female continues sitting, the

male

male at a good distance, but always within hearing, cheers the patient hour with his voice, and, by the short interruption of his song, often gives her warning of approaching danger. She lays four or five eggs; of which but a part, in our cold climate, come to maturity.

The delicacy, or rather the fame, of this bird's music, has induced many to abridge its liberty to secure its harmony. Its song, however, in captivity is not so very alluring; and the tyranny of taking it from those hedges where only it is most pleasing, still more depreciates its imprisoned efforts. Gesner assures us, that it is not only the most agreeable songster in a cage, but that it is possessed of a most admirable faculty of talking. He tells the following story in proof of his assertion, which he says was communicated to him by a friend. "Whilst I was at Ratibone," says his correspondent, "I put up at an inn, the sign of the Golden Crown, where my host had three nightingales. It happened at that time, being the spring of the year, when those birds are accustomed to sing, that I was so afflicted with the stone, that I could sleep but very little all night. It was usual then about midnight, to hear the two nightingales jangling, and talking with each other, and plainly imitating men's discourses. Besides repeating the daily discourse of the guests, they chanted out two stories. One of their stories was concerning the tapster and his wife, who refused to follow him to the wars as he desired her; for the husband endeavoured to persuade his wife, as far as I understood by the birds, that he would leave his service in that inn, and go to the wars in hopes of plunder. But she refused to follow him, resolving to stay either at Ratibone, or go to Nuremberg. There was a long and earnest contention between them; and all this dialogue the birds repeated. They even repeated the unseemly words which were cast out between them, and which ought rather to have been suppressed and kept a secret. The other story was concerning the war which the emperor was then threatening against the protestants; which the birds probably heard from some of the generals that had conferences in the house. These things did they repeat in the night after twelve o'clock, when there was a deep silence. But in the day time, for the most part, they were silent, and seemed to do nothing but meditate and revolve with themselves upon what the guests conferred

“conferred together as they sat at table, or in their walks.”

Such is the sagacity ascribed to the nightingale. But there is a little bird, rather celebrated for its affection to mankind than its singing, which however, in our climate, has the sweetest note of all others. The reader already perceives that I mean the RED-BREAST, the well-known friend of man, that is found in every hedge, and makes it vocal. The note of other birds is louder, and their inflections more capricious; but this bird's voice is soft, tender, and well supported; and the more to be valued as we enjoy it the greatest part of the winter. If the nightingale's song has been compared to the fiddle, the red-breast's voice has all the delicacy of the flute.

THE LARK, whether the sky-lark, the wood, or the tit-lark, being all distinguishable from other little birds by the length of their heel, are louder in their song than either of the former, but not so pleasing. Indeed, the music of every bird in captivity produces no very pleasing sensations; it is but the mirth of a little animal insensible of its unfortunate situation; it is the landscape, the grove, the golden break of day, the contest upon the hawthorn, the fluttering from branch to branch, the soaring in the air, and the answering of its young, that gives the bird's song its true relish. These united, improve each other, and raise the mind to a state of the highest, yet most harmless exultation.

The lark builds its nest upon the ground, beneath some turf that serves to hide and shelter it. The female lays four or five eggs, of a dusky hue in colour, somewhat like those of a plover. It is while she is sitting that the male usually entertains her with his singing; and while he is risen to an imperceptible height, yet he still has his loved partner in his eye, nor once loses sight of the nest either while he ascends or is descending. This harmony continues several months, beginning early in the spring on pairing. In winter, they assemble in flocks, when their song forsakes them, and the bird-catchers destroy them in great numbers for the tables of the luxurious.

The BLACK-CAP and the WREN, though so very diminutive, are yet prized by some for their singing. The former is called by some the mock nightingale; and the latter

latter is admired for the loudness of its note, compared to the little body whence it issues.

THE CANARY-BIRD is now become so common, and has continued so long in a domestic state, that its native habits, as well as its native country, seem almost forgotten. Though, by the name, it appears that these birds came originally from the Canary Islands, yet we have them only from Germany, where they are bred up in great numbers, and sold into different parts of Europe.

In its native islands, a region equally noted for the beauty of its landscapes and the harmony of its groves, the canary-bird is of a dusky grey colour, and so different from those usually seen in Europe, that some have even doubted whether it be of the same species. With us, they have that variety of colouring usual in all domestic fowls; some white, some mottled, some beautifully shaded with green; but they are more esteemed for their note than their beauty, having a high piercing pipe, as indeed all those of the finch tribe have, continuing for some time in one breath without intermission, then raising it higher and higher by degrees, with great variety.

The LINNET and the GOLDFINCH so nearly resemble the canary-bird, that they have scarcely any peculiarities that can attract our curiosity. The gold-finch learns a fine song from the nightingale; and the linnet and bull-finch may be taught, forgetting the wild notes of nature, to whistle a long and regular tune.

OF THE SWALLOW and its Affinities.] In this tribe is to be found the GOAT-SUCKER, which may be styled a nocturnal swallow: it is the largest of this kind, and is known by its tail, which is not forked, like that of the common swallow. It begins its flight at evening, and makes a loud singular noise, like the whur of a spinning-wheel. To this also belongs the HOUSE-SWALLOW, which is too well known to need a description: the MARTIN, inferior in size to the former, and the tail much less forked; it differs also in its nest, which is covered at top, while that of the house-swallow is open; and the SWIFT, rather larger than the house-swallow, with all the toes standing forward; in which it differs from the rest of its kind. All these resemble each other so strongly, that it is not without difficulty the smaller kinds are known asunder.

These

These are all known by their very large mouths, which, when they fly are always kept open; they are not less remarkable for their short slender feet, which scarcely are able to support the weight of their bodies; their wings are of immoderate extent for their bulk; their plumage is glossed with a rich purple; and their note is a slight twittering, which they seldom exert but upon the wing.

This peculiar conformation seems attended with a similar peculiarity of manners. Their food is insects, which they always pursue flying. For this reason, during fine weather, when the insects are most likely to be abroad, the swallows are for ever upon the wing, and seen pursuing their prey with amazing swiftness and agility. All smaller animals, in some measure, find safety by winding and turning, when they endeavour to avoid the greater: the lark thus evades the pursuit of the hawk; and man the crocodile. In this manner, insects upon the wing endeavour to avoid the swallow; but this bird is admirably fitted by nature to pursue them through their shortest turnings. Besides a great length of wing, it is also provided with a long tail, which, like a rudder, turns it in its most rapid motions; and thus, while it is possessed of the greatest swiftness, it is also possessed of the most extreme agility.

The nest of these birds is built with great industry and art; particularly by the common swallow, which builds it on the tops of chimnies. The martin sticks it to the eaves of houses. The goat-sucker, as we are told, builds it on the bare ground. This nest is built with mud from some neighbouring brook, well tempered with the bill, moistened with water for the better adhesion, and still farther kept firm, by long grass and fibres: within it is lined with goose feathers, which are ever the warmest and the neatest. The martin covers its nest at top, and has a door to enter at; the swallow leaves her's quite open. But our European nests are nothing to be compared with those the swallow builds on the coasts of China and Coromandel; the description of which I will give, in the plain honest phrase of Willughby. "On the sea-coast of the kingdom of China," says he, "a sort of party-coloured birds, of the shape of swallows, gather a certain clammy, glutinous matter, perchance the spawn of whales and other young fishes, of which they build their nests, wherein they lay their eggs and hatch their young. These nests the Chinese pluck from the rocks, and bring them in great numbers, into the East-Indies to sell. They are esteemed, by gluttons, as great delicacies;

“cies; who, dissolving them in chicken, or mutton-broth, are very fond of them; far before oysters, mushrooms, or other dainty and lickorish morsels.”

At the latter end of September the swallows leave us; and for a few days previous to their departure, assemble, in vast flocks, on house-tops, as if deliberating on the fatiguing journey that lay before them. This is no slight undertaking, as their flight is directed to Congo, Senegal, and along the whole Morocco shore. There are some, however, left behind in this general expedition, that do not part till eight or ten days after the rest. These are chiefly the latter weakly broods, which are not yet in a condition to set out.

Those that migrate are first observed to arrive in Africa about the beginning of October. They are thought to have performed their fatiguing journey in the space of seven days. They are sometimes seen, when interrupted by contrary winds, wavering in their course far off at sea, and lighting upon whatever ship they find in their passage. They then seem spent with famine and fatigue, yet still they boldly venture, when refreshed by a few hours rest, to renew their flight, and continue the course which they had been steering before.

OF THE HUMMING-BIRD and its Varieties.] Of this charming little animal, there are six or seven varieties, from the size of a small wren, down to that of an humble-bee. An European could never have supposed a bird existing so very small, and yet completely furnished out with a bill, feathers, wings, and intestines, exactly resembling those of the largest kind. A bird not so big as the end of one's little finger, would probably be supposed but a creature of imagination, were it not seen in infinite numbers, and as frequent as butterflies in a summer's day, sporting in the fields of America, from flower to flower, and extracting their sweets with its little bill.

The smallest humming-bird is about the size of an hazel-nut. The feathers on its wings and tail are black; but those on its body, and under its wings, are of a greenish brown, with a fine red cast or gloss, which no silk or velvet can imitate. It has a small crest on its head, green at the bottom, and as it were gilded at the top; and which sparkles in the sun like a little star in the middle of its forehead. The bill is black, straight, slender, and of the length of a small pin. The larger humming-bird is near half

half as big as the common wren, and without a crest on its head ; but, to make amends, it is covered, from the throat half way down the belly, with changeable crimson-coloured feathers, which in different lights, change to a variety of beautiful colours, much like an opal. The heads of both are small, with very little round eyes as black as jet.

It is inconceivable how much these add to the high finishing and beauty of a rich luxurious western landscape. As soon as the sun is risen, the humming-birds, of different kinds, are seen fluttering about the flowers, without ever lighting upon them. Their wings are in such rapid motion, that it is impossible to discern their colours, except by their glittering. They are never still, but continually in motion, visiting flower after flower, and extracting its honey. For this purpose they are furnished with a forked tongue, that enters the cup of the flower, and extracts its nectared tribute. Upon this alone they subsist. The rapid motion of their wings brings out an humming sound, whence they have their name.

The nests of these birds are not less curious than the rest : they are suspended in the air, at the point of the twigs of an orange, a pomegranate, or a citron tree ; sometimes even in houses, if they find a small and convenient twig for the purpose. The female is the architect, while the male goes in quest of materials ; such as cotton, fine moss, and the fibres of vegetables. The nest is about the size of an hen's egg cut in two. They lay two eggs at a time, and never more, about the size of small peas, and as white as snow, with here and there a yellow speck. The time of incubation continues twelve days ; at the end of which the young ones appear, and are much about the size of a blue-bottle-fly.

It is a doubt whether or not these birds have a continued note in singing. All travellers agree that, beside the humming noise produced by their wings, they have a little interrupted chirrup ; but Labat asserts, that they have a most pleasing melancholy melody in their voices, though small and proportioned to the organs which produce it. It is very probable that, in different places, their notes are also different ; and as there are some that continue torpid all the winter, there may likewise be some with agreeable voices, though the rest may in general be silent.

C H A P XXVII.

Of the Crane Species.—The Crane.—The Stork.—The Balearic Crane, and other foreign Cranes.—The Buffoon Bird.—The Heron.—The Bittern.—The Spoon-bill.—The Flamingo.—The Scooper.—The Runner.—The Curlew.—The Godwit.—The Woodcock.—The Snipe.—The Ruff.—The Lapwing and Plover.—The Dottrel.—The Sea-lark.—The Water-hen.—The Coot, &c.

THE CRANE.] Willughby and Pennant make the crane from five to six feet long, from the tip to the tail. Other accounts say, that it is above five feet high; and others that it is as tall as a man. A bird, however, the body of which is not larger than that of a turkey-hen, and acknowledged on all hands not to weigh above ten pounds, cannot easily be supposed to be almost as long as an ostrich. Brisson, therefore, seems to give this bird its real dimensions, when he describes it about three feet high, and about four from the tip to the tail. But, perhaps, that from which he took his dimensions, was one of the smallest of the kind.

It is a tall, slender bird, with a long neck and long legs. The top of the head is covered with black bristles, and the back of it is bald and red, which sufficiently distinguishes this bird from the stork, to which it is very nearly allied in size and figure. The plumage, in general, is ash-coloured; and there are two large tufts of feathers, that spring from the pinion of each wing. These bear a resemblance to hair, and are finely curled at the ends, which the bird has a power of erecting and depressing at pleasure. Gesner says, that these feathers, in his time, used to be set in gold, and worn as ornaments in caps.

The crane is a very social bird, and they are seldom seen alone. Their usual method of flying or sitting is in flocks of fifty or sixty together; and while a part feed, the rest stand like centinels upon duty. It for the most part subsists upon vegetables; and is known in every country of Europe, except our own. As they are birds of passage, they are seen to depart and return regularly at those seasons when their provision invites or repels them. They generally leave Europe about the latter end of autumn, and return in the beginning of summer. In the inland parts of the continent, they are seen crossing the country, in flocks
of

of fifty or an hundred, making from the northern regions towards the south. In these migrations, however, they are not so resolutely bent upon going forward, but that if a field of corn offers in their way, they will stop a while to regale upon it: on such occasions they do incredible damage, chiefly in the night; and the husbandman, who lies down in joyful expectation, rises in the morning to see his fields laid entirely waste, by an enemy, whose march is too swift for his vengeance to overtake.

The cold arctic region seems to be this bird's favourite abode. They come down into the more southern parts of Europe rather as visitants than inhabitants.

In their journeys it is amazing to conceive the heights to which they ascend, when they fly. Their note is the loudest of all birds; and is often heard in the clouds, when the bird itself is entirely unseen. As it is light for its size, and spreads a large expanse of wing, it is capable of floating, at the greatest height, where the air is lightest; and as it secures its safety, and is entirely out of the reach of man, it flies in tracts which would be too fatiguing for any other birds to move forward in.

In these aerial journeys, though unseen themselves, they have the distinctest vision of every object below. They govern and direct their flight by their cries: and exhort each other to proceed or descend, when a fit opportunity offers for depredation. As they rise but heavily, they are very shy birds, and seldom let the fowler approach them. Corn is their favourite food; but there is scarcely any other that comes amiss to them. Redi, who opened several, found the stomach of one full of the herb called dandelion; that of another was filled with beans; a third had a great quantity of clover in its stomach; while those of two others were filled with earth-worms and beetles: in some he found lizards and sea-fish; in others, snails, grass, and pebbles, swallowed perhaps for medicinal purposes.

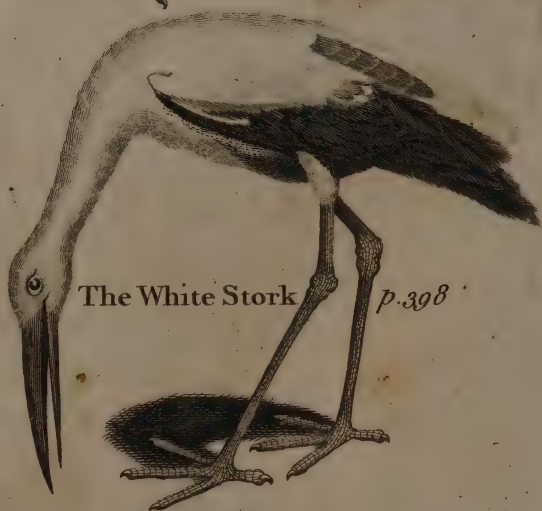
In general it is a peaceful bird, both in its own society, and with respect to those of the forest. It is an animal easily tamed; and if we can believe Albertus Magnus, has a particular affection for man.

STORKS are birds of passage, like the former; but it is hard to say whence they come or whither they go. When they withdraw from Europe, they all assemble on a particular day, and never leave one of their company behind them. They take their flight in the night; which is the
reason





The Balearic Crane p. 399.



The White Stork

p.398

reason the way they go has never been observed. They generally return into Europe in the middle of March, and make their nests on the tops of chimnies and houses as well as of high trees. The females lay from two to four eggs, of the size and colour of those of geese. They are a month in hatching; and when their young are excluded, they are particularly solicitous for their safety.

As the food of these birds consists in a great measure of frogs and serpents, it is not to be wondered at that different nations have paid them a particular veneration. The Dutch are very solicitous for the preservation of the stork in every part of their republic. This bird seems to have taken refuge among their towns; and builds on the tops of their houses without any molestation. There it is seen resting familiarly in their streets, and protected as well by the laws as the prejudices of the people.

THE BALEARIC CRANE for a long time continued unknown, till we became acquainted with the birds of tropical climates, when one of the crane kind with a topping was brought into Europe, and described by Aldrovandus as Pliny's balearic crane. It is pretty nearly of the shape and size of the ordinary crane, with long legs and a long neck, like others of the kind; but the bill is shorter, and the colour of the feathers of a dark greenish grey. The head and throat form the most striking part of this bird's figure. On the head is seen standing up a thick round crest, made of bristles, spreading every way, and resembling rays standing out in different directions. The longest of these rays are about three inches and an half; and they are all topped with a kind of black tassels, which give them a beautiful appearance. The sides of the head and cheeks are bare, whitish, and edged with red, while underneath the throat hangs a kind of bag or wattle, like that of a cock, but not divided into two. This bird comes from the coast of Africa and the Cape de Verd Islands. As it runs, it stretches out its wings, and goes very swiftly, otherwise its usual motion is very slow. In their domestic state, they walk very deliberately among other poultry, and suffer themselves to be approached by every spectator. They never roost in houses: but about night, when they are disposed to go to rest, they search out some high wall, on which they perch in the manner of a peacock. Indeed, they so much resemble that bird in manners and disposition, that some have described them by the name of the sea-peacock. But, though their

voice and roosting be similar, their food, which is entirely upon greens, vegetables, and barley, seems to make some difference.

Under this head of foreign birds of the crane-kind, it will be proper to mention the JABIRU and the JABIRU GUACU, both natives of Brasil. Of these great birds of the crane-kind we know but little, except the general out-line of their figure, and the enormous bills which we often see preserved in the cabinets of the curious. The bill of the latter is red, and thirteen inches long: the bill of the former is black, and is found to be eleven. Neither of them, however, are of a size proportioned to their immoderate length of bill. The jabiru guacu is not above the size of a common stork, while the jabiru with the smallest bill exceeds the size of a swan. They are both covered with white feathers, except the head and neck, that are naked; and their principal difference is in the size of the body and the make of the bill; the lower chap of the jabiru guacu being broad, and bending upwards.

A bird still more extraordinary may be added to this class, called the ANHIMA, and, like the two former, a native of Brasil. This is a water-fowl of the rapacious kind, and bigger than a swan. The head, which is small for the size of the body, bears a black bill, which is not above two inches long; but what distinguishes it in particular is a horn growing from the forehead as long as the bill, and bending forward like that of the fabulous unicorn of the ancients. This horn is not much thicker than a crow-quill, as round as if it were turned in a lathe, and of an ivory colour. But this is not the only instrument of battle this formidable bird carries; it seems to be armed at all points; for at the fore-part of each wing, at the second joint, spring two straight triangular spurs, about as thick as one's little finger: the foremost of these goads or spurs is above an inch long; the hinder is shorter, and both of a dusky colour. The claws also are long and sharp; the colour is black and white; and they cry terribly loud. They are never found alone, but always in pairs; the cock and hen prowl together; and their fidelity is said to be such, that when one dies, the other never departs from the carcase, but dies with its companion. It makes its nest of clay, near the bodies of trees, upon the ground, of the shape of an oven.

One bird more may be subjoined to this class, not for the oddity of its figure, but the peculiarity of its manners.

It

It is vulgarly called by our sailors, the BUFFOON bird, and by the French the demoiselle, or lady. The peculiar gestures and contortions of this bird, the proper name of which is the NUMIDIAN CRANE, are extremely singular. It stoops, rises, lifts one wing, then another, turns round, sails forwards, then back again; all which highly diverts our seamen; not imagining, perhaps, that all these contortions are but the awkward expression not of the poor animal's pleasures, but its fears.

It is a very scarce bird; the plumage is of a leaden grey; but it is distinguished by fine white feathers, consisting of long fibres, which fall from the back of the head, about four inches long; while the fore-part of the neck is adorned with black feathers, composed of very fine, soft, and long fibres, that hang down upon the stomach, and give the bird a very graceful appearance.

[OF THE HERON AND ITS VARIETIES.] Of this tribe, Brisson has enumerated not less than forty-seven sorts, all differing in their size, figure, and plumage; and with talents adapted to their place of residence, or their peculiar pursuits. But, how various soever the heron kind may be in their colours or their bills, they all seem possessed of the same manners, and have but one character of cowardice and rapacity, indolence, yet insatiable hunger. Other birds are found to grow fat by an abundant supply of food; but these, though excessively destructive and voracious, are ever found to have lean and carrion bodies, as if not even plenty were sufficient for their support.

The common heron is remarkably light, in proportion to its bulk, scarce weighing three pounds and an half, yet it expands a breadth of wing which is five feet from tip to tip. Its bill is very long, being five inches from the point to the base; its claws are long, sharp, and the middlemost toothed like a saw. Yet, thus armed as it appears for war, it is indolent and cowardly, and even flies at the approach of a sparrow-hawk. Of all birds, this commits the greatest devastation in fresh-waters; and there is scarcely a fish, though ever so large, that he will not strike at and wound, though unable to carry it away. But the smaller fry are his chief subsistence; these, pursued by their larger fellows of the deep, are obliged to take refuge in shallow waters, where they find the heron a still more formidable enemy. His method is to wade as far as he can go into the water, and there patiently wait the approach of his prey,

which when it comes within sight, he darts upon it with an inevitable aim. In this manner he is found to destroy more in a week than an otter in three months. "I have seen an heron," says Willughby, "that had been shot, that had seventeen carps in his belly at once, which he will digest in six or seven hours. I have seen a carp," continues he, "taken out of a heron's belly, nine inches and an half long. Several gentlemen who kept tame herons, to try what quantity one of them would eat in a day, have put several smaller roach and dace in a tub; and they have found him eat fifty in a day; one day with another. In this manner a single heron will destroy fifteen thousand carp in a single half year."

But, though in seasons of fine weather the heron can always find a plentiful supply; in cold or stormy seasons, his prey is no longer within reach: the fish that before came into the shallow water now keep in the deep, as they find it to be the warmest situation. Frogs and lizards also seldom venture from their lurking places; and the heron is obliged to support himself upon his long habits of patience, and even to take up with the weeds that grow upon the water. At those times he contracts a consumptive disposition, which succeeding plenty is not able to remove; so that the meagre glutton spends his time between want and riot, and feels alternately the extremes of famine and excess. Hence, notwithstanding the care with which he takes his prey, and the amazing quantity he devours, the heron is always lean and emaciated; and though his crop be usually found full, yet his flesh is scarce sufficient to cover the bones.

Though this bird lives chiefly among pools and marshes, yet its nest is built on the tops of the highest trees, and sometimes on cliffs hanging over the sea. They are never in flocks when they fish, committing their depredations in solitude and silence; but in making their nests they love each others society; and they are seen, like rooks, building in company with flocks of their kind. Their nests are made of sticks and lined with wool; and the female lays four large eggs of a pale green colour. The observable indolence of their nature, however, is not less seen in their nestling than in their habits of depredation. Nothing is more certain, and I have seen it an hundred times, than that they will not be at the trouble of building a nest when they can get one made by the rook, or deserted by the owl, already provided for them. This they usually enlarge and
line

line within, driving off the original possessors should they happen to renew their fruitless claims.

The heron is said to be a very long-lived bird; by Mr. Keyssler's account it may exceed sixty years; and by a recent instance of one that was taken in Holland, by an hawk belonging to the stadtholder, its longevity is again confirmed, the bird having a silver plate fastened to one leg, with an inscription, importing that it had been struck by the elector of Cologne's hawks thirty-five years before.

OF THE BITTERN OR MIRE-DRUM.] Those who have walked in an evening by the sedgy sides of unfrequented rivers, must remember a variety of notes from different water-fowl: the loud scream of the wild goose, the croaking of the mallard, the whining of the lapwing, and the tremulous neighing of the jack snipe. But of all those sounds, there is none so dismally hollow as the booming of the bittern. It is impossible for words to give those who have not heard this evening-call an adequate idea of its solemnity. It is like the interrupted bellowing of a bull, but hollower and louder, and is heard at a mile's distance, as if issuing from some formidable being that resided at the bottom of the waters.

The bird, however, that produces this terrifying sound is not so big as an heron, with a weaker bill, and not above four inches long. It differs from the heron chiefly in its colour, which is in general of a paleish yellow, spotted and barred with black. Its wind-pipe is fitted to produce the sound for which it is remarkable; the lower part of it dividing into the lungs is supplied with a thin loose membrane, that can be filled with a large body of air, and exploded at pleasure. These bellowing explosions are chiefly heard from the beginning of spring to the end of autumn; and, however awful they may seem to us, are the calls to courtship, or connubial felicity.

This bird, though of the heron kind, is yet neither so destructive nor so voracious. It is a retired, timorous animal, concealing itself in the midst of reeds and marshy places, and living upon frogs, insects, and vegetables; and though so nearly resembling the heron in figure, yet differing much in manners and appetites. It lays its nest in a sedgy margin, or amidst a tuft of rushes, and composes its simple habitation of sedges, the leaves of water-plants, and dry rushes. It lays generally seven or eight eggs of an ash-green colour, and in three days leads its little ones to their food.

The flesh of the bittern is greatly in esteem among the luxurious. For this reason, it is as eagerly sought after by the fowler as it is shunned by the peasant; and as it is a heavy-rising, slow-winged bird, it does not often escape him. Indeed, it seldom rises but when almost trod upon; and seems to seek protection rather from concealment than flight. At the latter end of autumn, however, in the evening, its wonted indolence appears to forsake it. It is then seen rising in a spiral ascent till it is quite lost from the view, and makes at the same time a singular noise very different from its former boomings.

THE SPOONBILL is one of those birds which differs a good deal from the crane, yet approaches this class more than any other. The body is more bulky for its height, and the bill is very differently formed from that of any other bird whatever. Yet still it is a comparatively tall bird; it feeds among waters; its toes are divided; and it seems to possess the natural dispositions of the crane. The European spoon-bill is of about the bulk of a crane; but as the one is above four feet high, the other is not more than three feet three inches. The common colour of those of Europe, is a dirty white; but those of America are of a beautiful rose colour, or a delightful crimson. Beauty of plumage seems indeed, to be the prerogative of all the birds of that continent. The bill, which in this bird is so very particular, is about seven inches long, and running out broad at the end, as its name justly serves to denote, it is there about an inch and a half wide. This strangely fashioned instrument, in some is black; in others of a light grey; and in those of America, it is of a red colour, like the rest of the body. All round the upper chap there runs a kind of rim, with which it covers that beneath; and as for the rest, its cheeks and its throat are without feathers, and covered with a black skin.

THE SHOVELER chiefly feeds upon frogs, toads, and serpents; of which, particularly at the Cape of Good Hope, they destroy great numbers. The inhabitants of that country hold them in as much esteem as the ancient Egyptians did their bird ibis: the shoveler runs tamely about their houses; and they are content with its society, as an useful though an homely companion. They are never killed; and indeed they are good for nothing when they are dead, for the flesh is unfit to be eaten.

This



The Calao or Horned Indian Raven

p. 373



The Spoon bill p. 404

This bird breeds in Europe, in company with the heron, in high trees ; and in a nest formed of the same materials.

It lays from three to five eggs ; white, and powdered with a few sanguine or pale spots.

THE FLAMINGO is the most remarkable of all the crane kind, the tallest, bulkiest, and the most beautiful. The body, which is of a beautiful scarlet, is no bigger than that of a swan ; but its legs and neck are of such an extraordinary length, that when it stands erect, it is six feet six inches high. Its wings, extended, are five feet six inches from tip to tip ; and it is four feet eight inches from tip to tail. The head is round and small, with a large bill, seven inches long, partly red, partly black, and crooked like a bow. The legs and thighs, which are not much thicker than a man's finger, are about two feet eight inches high ; and its neck near three feet long. The feet are not furnished with sharp claws, as in others of the crane kind ; but feeble, and united by membranes, as in those of the goose. Of what use these membranes are, does not appear, as the bird is never seen swimming, its legs and thighs being sufficient for bearing it into those depths where it seeks for prey.

This extraordinary bird is now chiefly found in America, but was once known on all the coasts of Europe. Its beauty, its size, and the peculiar delicacy of its flesh, have been such temptations to destroy or take it, that it has long since deserted the shores frequented by man, and taken refuge in countries that are as yet but thinly peopled.

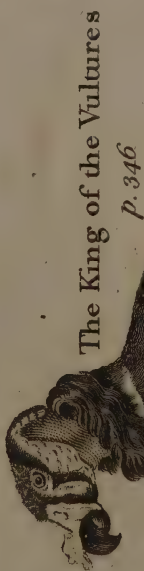
When the Europeans first came to America, and coasted down along the African shores, they found the flamingos on several shores on either continent, gentle, and no way distrustful of mankind. When the fowler had killed one, the rest of the flock, far from attempting to fly, only regarded the fall of their companion in a kind of fixed astonishment : another and another shot was discharged ; and thus the fowler often levelled the whole flock, before one of them began to think of escaping.

But at present it is very different in that part of the world ; and the flamingo is not only one of the scarcest but of the shyest birds in the world, and the most difficult of approach. They chiefly keep near the most deserted and inhospitable shores ; near salt-water lakes and swampy islands. When seen by mariners in the day, they always appear drawn up in a long close line of two or three hundred together ; and, as Dampier tells us, present, at the distance of half a mile,

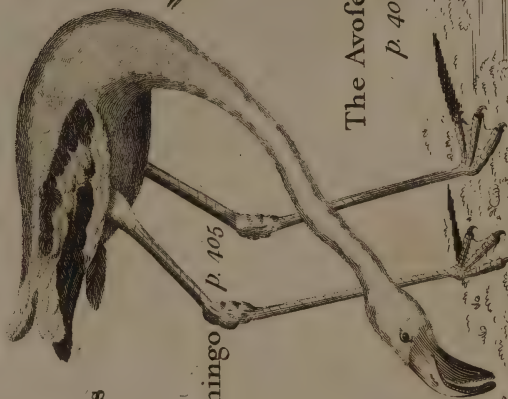
the exact representation of a long brick wall. Their rank, however, is broken when they seek for food; but they always appoint one of the number as a watch, whose only employment is to observe and give notice of danger, while the rest are feeding. As soon as this trusty centinel perceives the remotest appearance of danger, he gives a loud scream, with a voice as shrill as a trumpet, and instantly the whole cohort are upon the wing. The flesh of the old ones is black and hard; though, Dampier says, well tasted: that of the young ones is better. But, of all delicacies, the flamingo's tongue is the most celebrated. In fact, the Roman emperors considered them as the highest luxury; and we have an account of one of them, who procured fifteen hundred flamingos' tongues to be served up in a single dish. The tongue of this bird, which is so much sought after, is a good deal larger than that of any other bird whatever. The bill of the flamingo is like a large black box, of an irregular figure, and filled with a tongue which is black and gristly.

Their time of breeding is according to the climate in which they reside: in North America they breed in our summer; on the other side the line they take the most favourable season of the year. They build their nests in extensive marshes, and where they are in no danger of a surprise. The nest is not less curious than the animal that builds it: it is raised from the surface of the pool about a foot and a half, formed of mud, scraped up together, and hardened by the sun, or the heat of the bird's body: it resembles a truncated cone, or one of the pots which we see placed on chimnies; on the top it is hollowed out to the shape of the bird, and in that cavity the female lays her eggs, without any lining but the well cemented mud that forms the sides of the building. She always lays two eggs, and no more; and, as her legs are immoderately long, she straddles on the nest, while her legs hang down, one on each side into the water. The young ones are a long while before they are able to fly; but they run with amazing swiftness. They are sometimes caught; and, very different from the old ones, suffer themselves to be carried home, and are tamed very easily.

THE AVOSETTA, OR SCOOPER, is chiefly found in Italy, and now and then comes over into England. It is about the size of a pigeon, is a pretty upright bird, and has extremely long legs for its size; but the most extraordinary part of its figure is the bill, which turns up like a hook, in



The King of the Vultures
p. 346



The Flamingo
p. 405



The Avocetta
p. 406

an opposite direction to that of the hawk or the parrot. This extraordinary bill is black, flat, sharp and flexible at the end, and about three inches and a half long. From its being bare a long way above the knee, it appears, that it lives and wades in the waters. It has a chirping, pert note, as we are told, and is web-footed, like the duck.

To this bird of the crane kind, so little known, I will add another, still less known; the CORRIRA, or RUNNER. All we are told of it, is, that it has the longest legs of all web-footed fowls, except the flamingo, and avoÛsetta; that the bill is straight, yellow, and black at the ends; that the pupils of the eyes are surrounded with two circles; one of which is bay, and the other white; below, near the belly, it is whitish; the tail, with two white feathers, black at the extremities; and the upper part of the body, of the colour of rusty iron.

To these birds of the crane kind may be added, a numerous tribe of smaller fowls, which are generally distinguished by having their thighs partly bare of feathers. In this list is exhibited the CURLEW, a bird of about the size of a duck, with a bill four inches long; the WOODCOCK, about the size of a pigeon, with a bill three inches long; the GODWIT, of the same size, the bill four inches; the GREEN SHANK, longer legged, the bill two inches and an half; the RED SHANK, differing in the colour of its feet from the former; the SNIPE, less by half, with a bill three inches. Then, with shorter bills,—the RUFF, with a collar of feathers round the neck of the male; the KNOT, the SAND-PIPER, the SANDERLING, the DUNLIN, the PURRO, and the STINT. To conclude, with bills very short,—the LAPWING, the GREEN PLOVER, the GREY PLOVER, the DOTREL, the TURNSTONE, and the SEA-LARK. These, with their affinities, are properly natives or visitants of this country, and are dispersed along our shores, rivers, and watery grounds. Taking in the birds of this kind, belonging to other countries, the list would be very widely extended; and the whole of this class, as described by Brisson, would amount to near an hundred.

As these birds are usually employed rather in running than in flying, and as their food lies entirely upon the ground, and not on trees, or in the air, so they run with great swiftness for their size, and the length of their legs assists their velocity. But as, in seeking their food, they are often obliged to change their station, so also are they

equally swift of wing, and traverse immense tracts of country, without much fatigue.

It has been thought by some, that a part of this class lived upon an oily slime, found in the bottoms of ditches and of weedy pools; but later discoveries have shewn, that, in these places, they hunt for the caterpillars, worms and insects. The long-billed birds suck up worms and insects from the bottom; those furnished with shorter bills, pick up such insects as lie nearer the surface of the meadow, or among the sands on the sea-shore.

As all of this kind live entirely in waters, and among watery places, they seem provided by nature with a warmth of constitution to fit them for that cold element. They reside, by choice, in the coldest climates; and, as other birds migrate here in our summer, their migrations hither are mostly in the winter. Even those that reside among us the whole season, retire, in summer, to the tops of our bleakest mountains; where they breed, and bring down their young when the cold weather sets in.

The curlew, the woodcock, the snipe, the godwit, the grey plover, the green, and the long-legged plover, the knot, and the turnstone, are rather the guests than the natives of this island, though the nest of a straggling curlew, or a snipe, is sometimes found in our marshes. They visit us in the beginning of winter, and forsake us in the spring. They then retire to the mountains of Sweden, Poland, Prussia, and Lapland, to breed. Our country, during the summer season, becomes uninhabitable to them. The ground parched up by the heat, the springs dried away, and the vermicular insects already upon the wing, they have no means of subsisting. Their weak and delicately-pointed bills are unfit to dig into a resisting soil; and their prey is departed, though they were able to reach its retreats. Thus, that season when nature is said to teem with life, and to put on her gayest liveries, is to them an interval of sterility and famine.

The lapwing, the ruff, the red-shank, the sand-piper, the sea-pie, the Norfolk plover, and the sea-lark, breed in this country, and, for the most part, reside here. In summer, they frequent such marshes as are not dried up in any part of the year; the Essex hundreds, and the fens of Lincolnshire. There, in solitudes formed by surrounding marshes, they breed and bring up their young. In winter, they come down from their retreats, rendered uninhabitable

by the flooding of the waters, and seek their food about our ditches and marshy meadow-grounds. Yet, even of this class, all are wanderers upon some occasions, and take wing to the northern climates, to breed, and find subsistence. This happens when our summers are peculiarly dry, and when the fenny countries are not sufficiently watered to defend their retreats.

As all these birds run and feed upon the ground, so they are all found to nestle there. The number of eggs generally to be seen in every nest, is from two to four; never under, and very seldom exceeding. The nest is made without any art; but the eggs are either laid in some little depression of the earth, or on a few bents and long grass, that scarcely preserve them from the moisture below.

The lapwing and the plover are often seen to fight among themselves; but there is one little bird of this tribe, called the ruff, that has got the epithet of the fighter. In the beginning of spring, when these birds arrive among our marshes, they are observed to engage, with desperate fury, against each other. It is then that the fowlers, seeing them intent on mutual destruction, spread their nets over them, and take them in great numbers: yet, even in captivity, their animosity still continues. The people that fat them up for sale, are obliged to shut them up in close, dark rooms; for, if they let ever so little light in among them, the turbulent prisoners instantly fall to fighting with each other, and never cease till each has killed its antagonist, especially, says Willughby, if any body stands by. A similar animosity, though in less degree, prompts all this tribe; but when they have paired, and begun to lay, their contentions are then over.

The place these birds chiefly choose to breed in, is in some island surrounded with sedgy moors, where men seldom resort; and in such situations I have often seen the ground so strewed with eggs and nests, that one could scarce take a step without treading upon some of them. The arts of the lapwing to allure men or dogs from her nest, are perfectly amusing. When she perceives the enemy approaching, she never waits till they arrive at her nest, but boldly runs to meet them. When she has come as near them as she dares to venture, she then raises with a loud screaming before them, seeming as if she were just flushed from hatching; while she is then probably a hundred yards from the nest. Thus she flies, with great clamour and anxiety, whining and screaming round the invaders, striking

at them with her wings, and fluttering as if she were wounded.

THE WATER-HEN, and the COOT, have too near an affinity not to be ranked in the same description. They are shaped entirely alike; their legs are long, and their thighs partly bare; their necks are proportionable, their wings short, their bills short and weak, their colour black, their foreheads bald and without feathers, and their habits entirely the same. The water-hen weighs but fifteen ounces; the coot twenty-four. The bald part of the forehead in the coot is black; in the water-hen it is of a beautiful pink colour. The toes of the water-hen are edged with a straight membrane; those of the coot have it scolloped and broader.

As birds of the crane kind are furnished with long wings, and easily change place, the water-hen, whose wings are short, is obliged to reside entirely near those places where her food lies: she never leaves the side of the pond or the river in which she seeks for provision. She builds her nest upon low trees and shrubs, of sticks and fibres, by the water side. She lays twice or thrice in a summer. Her young ones swim the moment they leave the egg, pursue their parent, and imitate all her manners. She rears, in this manner, two or three broods in a season; and when the young are grown up, she drives them off, to shift for themselves.

As the coot is a larger bird, it is always seen in larger streams, and more remote from mankind. It there makes a nest of such weeds as the stream supplies, and lays them among the reeds, floating on the surface, and rising and falling with the water. The reeds among which it is built, keep it fast; so that it is seldom washed into the middle of the stream. But if this happens, which is sometimes the case, the bird sits in her nest, like a mariner in his boat, and steers, with her legs, her cargo into the nearest harbour: there, having attained her port, she continues to sit in great tranquillity, regardless of the impetuosity of the current; and, though the water penetrates her nest, she hatches her eggs in that wet condition.

To these birds with long legs and finny toes, I will add one species more, with short legs and finny toes: I mean the GREBE. It is much larger than either of the former, and its plumage white and black. It differs also entirely in the shortness of its legs, which are made for swimming, and
not

not walking : in fact, they are, from the knee upward, hid in the belly of the bird, and have consequently very little motion. By this mark, and by the scolloped fringe of the toes, this bird may be easily distinguished from all others.

As they are thus, from the shortness of their wings, ill formed for flying, and, from the uncommon shortness of their legs, utterly unfitted for walking, they seldom leave the water, and chiefly frequent those broad, shallow pools where their faculty of swimming can be turned to the greatest advantage, in fishing and seeking their prey.

They are chiefly, in this country, seen to frequent the meres of Shropshire and Cheshire ; where they breed among reeds and flags, in a floating nest. It is never seen on land ; and, though disturbed ever so often, will not leave that lake where alone, by diving and swimming, it can find food and security. It is chiefly sought for the skin of its breast, the plumage of which is of a most beautiful silvery white, and as glossy as satin.

C H A P. XXVIII.

Of Water-Fowl.—The Pelican.—The Albatross.—The Cormorant.—The Soland Goose.—The Gull.—The Petrel.—The Penguin.—The Diver.—The Awk.—The Guillemot.—The Puffin.—The Gooseander.—The Swan.—The Goose.—The Barnacle.—The Brent Goose.—The Duck.—The Eider Duck.—The Schoter.—The Sheldrake.—The Pochard.—The Widgeon.—The Teal.—The Muscovy Duck, &c.—Of Decoys for taking Ducks.—The King Fisher.

THE PELICAN of Africa is much larger than a swan, and somewhat of the same shape and colour. Its four toes are all webbed together ; and its neck, in some measure, resembles that of a swan : but that singularity in which it differs from all other birds, is in the bill, and the great pouch underneath, which are wonderful, and demand a distinct description. This enormous bill is fifteen inches from the point to the opening of the mouth, which is a good way back behind the eyes. The base of the bill is somewhat greenish ; but it varies towards the end, being of a reddish blue. To the lower edges of the under-chap, hangs a bag, reaching the whole length of the bill to the neck, which is said to be capable of containing fifteen quarts of water. This bag the bird has a power of wrinkling up
into

into the hollow of the under-chap; but, by opening the bill, and putting one's hand down into the bag, it may be distended at pleasure. It is not covered with feathers, but a short downy substance, as smooth and as soft as satin. Tertre affirms, that this pouch will hide as many fish as will serve sixty hungry men for a meal. Such is the formation of this extraordinary bird, which is a native of Africa and America. It was once also known in Europe, particularly in Russia; but it seems to have deserted our coasts.

The pelicans are of an ash-colour. They are torpid and inactive to the last degree, so that nothing can exceed their indolence but their gluttony. It is only from the stimulations of hunger, that they are excited to labour; for otherwise they would continue always in fixed repose. When they have raised themselves about thirty or forty feet above the surface of the sea, they turn their head, with one eye downwards, and continue to fly in that posture. As soon as they perceive a fish sufficiently near the surface, they dart down upon it with the swiftness of an arrow, seize it with unerring certainty, and store it up in their pouch. They then rise again, though not without great labour, and continue hovering and fishing, with their head on one side, as before.

This work they continue, with great effort and industry, till their bag is full; and then they fly to land, to devour and digest, at leisure, the fruits of their industry. This, however, it would appear, they are not long performing; for, towards night, they have another hungry call; and they again reluctantly go to labour. Their life is spent between sleeping and eating; and they are as foul as they are voracious, as they are every moment voiding excrements in heaps as large as one's fist. The female makes no preparation for her nest, nor seems to chuse any place in preference to lay in, but drops her eggs on the bare ground, to the number of five or six, and there continues to hatch them. The flesh is not fit to eat.

With all the seeming indolence of this bird, it is not entirely incapable of instruction in a domestic state. Father Raymond assures us, that he has seen one so tame and well educated among the native Americans, that it would go off in the morning, at the word of command, and return before night to its master, with its great paunch distended with plunder; a part of which the savages would make it disgorge, and a part they would permit it to reserve for itself.

“ The

“ The pelican,” as Faber relates, “ is not destitute of
 “ other qualifications. One of those which was brought
 “ alive to the Duke of Bavaria’s court, where it lived forty
 “ years, seemed to be possessed of very uncommon sensa-
 “ tions. It was much delighted in the company and con-
 “ versation of men, and in music, both vocal and instru-
 “ mental ; for it would willingly stand,” says he, “ by
 “ those that sung or sounded the trumpet ; and, stretching
 “ out its head, and turning its ear to the music, listened
 “ very attentively to its harmony, though its own voice
 “ was little pleasanter than the braying of an ass.”

Gesner tells us, that the emperor Maximilian had a tame pelican which lived for above eighty years, and which always attended his army on their march.

THE ALBATROSS is one of the largest and most formidable birds of Africa and America. Its body is rather larger than that of a pelican ; and its wings, when extended, ten feet from tip to tip. The bill, which is six inches long, is yellowish, and terminates in a crooked point. The top of the head is of a bright brown ; the back is of a dirty deep spotted brown ; and the belly and under the wings is white. The toes, which are webbed, are of a flesh colour.

This bird is an inhabitant of the tropical climates, and also beyond them, as far as the Streights of Magellan, in the South Seas. It not only eats fish, but also such small water-fowl as it can take by surprize. It preys, as all the gull kind do, upon the wing, and chiefly pursues the flying fish that are forced from the sea by the dolphins.

The albatross seems to have a peculiar affection for the penguin, and a pleasure in its society. They are always seen to choose the same places of breeding ; some distant, uninhabited island, where the ground slants to the sea, as the penguin is not formed either for flying or climbing. In such places their nests are seen together, as if they stood in need of mutual assistance and protection. In the middle, on high, the albatross raises its nest, on heath sticks and long grass, about two feet above the surface ; and round this, the penguins make their lower settlements, rather in holes in the ground ; and most usually eight penguins to one albatross.

THE CORMORANT is about the size of a large Muscovy duck, and may be distinguished from all other birds of this kind,

kind, by its four toes being united by membranes together; and by the middle toe being toothed or notched, like a saw, to assist it in holding its fishy prey. The head and neck of this bird are of a sooty blackness; and the body thick and heavy, more inclining in figure to that of the goose than the gull. As soon as the winter approaches, they are seen dispersed along the sea-shore, and ascending up the mouths of fresh-water rivers, carrying destruction to all the finny tribe. They are most remarkably voracious, and have a most sudden digestion. Their appetite is for ever craving, and never satisfied. This gnawing sensation may probably be encreased by the great quantity of small worms that fill their intestines, and which their unceasing gluttony contributes to engender.

This bird has the most rank and disagreeable smell, and is more foetid than even carrion, when in its most healthful state. It is seen as well by land as sea; it fishes in fresh-water lakes, as well as in the depths of the ocean; it builds in the cliffs of rocks, as well as on trees; and preys not only in the day-time, but by night.

Its indefatigable nature, and its great power in catching fish, were probably the motives that induced some nations to breed this bird up tame, for the purposes of fishing. The description of their manner of fishing is thus delivered by Faber. "When they carry them out of the rooms where they are kept, to the fish-pools, they hood-wink them, that they may not be frightened by the way. When they are come to the rivers, they take off their hoods; and having tied a leather thong round the lower part of their necks, that they may not swallow down the fish they catch, they throw them into the river. They presently dive under water; and there, for a long time, with wonderful swiftness, pursue the fish; and when they have caught them, rise to the top of the water, and press the fish lightly with their bills, swallow them; till each bird hath, after this manner, devoured five or six fishes. Then their keepers call them to the list, to which they readily fly; and, one after another vomit up all their fish, a little bruised with the first nip given in catching them. When they have done fishing, setting the birds on some high place, they loose the string from their necks, leaving the passage to the stomach free and open; and, for their reward, they throw them part of their prey; to each one or two fishes, which they will catch most dexterously, as they are falling in the air." At present, the cormorant

is trained up in every part of China for the same purpose.
 “ It is very pleasant, to behold with what sagacity they por-
 “ tion out the lake or the canal where they are upon duty.
 “ When they have found their prey, they seize it with
 “ their beak by the middle, and carry it without fail to their
 “ master. When the fish is too large, they then give each
 “ other mutual assistance: one seizes it by the head, the
 “ other by the tail, and in this manner carry it to the boat
 “ together. They have always, while they fish, a string
 “ fastened round their throats, to prevent them from de-
 “ vouring their prey.”

THE GANNET, OR SOLAND GOOSE, is of the size of a tame goose, but its wings much longer, being six feet over. The bill is six inches long, straight almost to the point. It differs from the cormorant in size, being larger; in its colour, which is chiefly white; and by its having no nostrils, but in their place a long furrow that reaches almost to the end of the bill. From the corner of the mouth is a narrow slip of black bare skin, that extends to the hind part of the head; beneath the skin is another that, like the pouch of the pelican, is dilatable, and of size sufficient to contain five or six entire herrings, which in the breeding season it carries at once to its mate or its young.

These birds, which subsist entirely upon fish, chiefly resort to those uninhabited islands where their food is found in plenty, and men seldom come to disturb them. The islands to the north of Scotland, the Skelig islands off the coasts of Kerry, in Ireland, and those that lie in the north sea off Norway, abound with them. But it is on the Bass island, in the Firth of Edinburgh, where they are seen in the greatest abundance. “ It is scarcely possible to walk there without
 “ treading on them: the flocks of birds upon the wing,
 “ are so numerous, as to darken the air like a cloud; and
 “ their noise is such, that one cannot, without difficulty,
 “ be heard by the person next to him.”

The gannet is a bird of passage. In winter it seeks the more southern coasts of Cornwall, hovering over the shoals of herrings and pilchards that then come down from the northern seas: its first appearance in the northern islands is in the beginning of spring; and it continues to breed till the end of summer. But, in general, its motions are determined by the migrations of the immense shoals of herrings that come pouring down at that season through the British Channel, and supply all Europe as well as this bird with
 their

their spoil. The gannet assiduously attends the shoal in their passage, keeps with them in their whole circuit round our island, and shares with our fishermen this exhaustless banquet. As it is strong of wing, it never comes near the land; but is constant to its prey. The young gannet is counted a great dainty by the Scots, and sold very dear.

THE GULL, and all its varieties, is very well known in every part of the kingdom. It is seen with a slow-sailing flight hovering over rivers, to prey upon the smaller kinds of fish; it is seen following the plowman in fallow fields to pick up insects; and when living animal food does not offer, it has even been known to eat carrion and whatever else of the kind that offers. Gulls are found in great plenty in every place; but it is chiefly round our boldest rockiest shores that they are seen in the greatest abundance; it is there that the gull breeds and brings up its young; it is there that millions of them are heard screaming with discordant notes for months together.

Those who have been much upon our coasts know that there are two different kinds of shores; that which slants down to the water with a gentle declivity, and that which rises with a precipitate boldness, and seems set as a bulwark to repel the force of the invading deeps. It is to such shores as these that the whole tribe of the gull-kind resort, as the rocks offer them a retreat for their young, and the sea a sufficient supply.

These birds, like all others of the rapacious kind, lay but few eggs; and hence, in many places, their number is daily seen to diminish. Most of the kind are fishy tasted, with black stringy flesh; yet the young ones are better food: and of these, with several other birds of the penguin kind, the poor inhabitants of our northern islands make their wretched banquets. They have been long used to no other food; and even salted gull can be relished by those who know no better. Of the gull species there are more than twenty different kinds; of the PETREL three, and of the sea-swallow the same number. They have all nearly the same habits, the same nature, and are caught in the same manner, either by covering their nests with a net, or by striking them with a pole as they fly out of their holes.

THE PENGUIN is but ill fitted for flight, and still less for walking. The largest of this kind, indeed, which have a thick, heavy body to raise, cannot fly at all. Their wings
serve

serve them rather as paddles to help them forward, when they attempt to move swiftly; and in a manner walk along the surface of the water. Even the smaller kinds seldom fly by choice; they flutter their wings with the swiftest efforts without making way; and though they have but a small weight of body to sustain, yet they seldom venture to quit the water where they are provided with food and protection.

As the wings of the penguin tribe are unfitted for flight, their legs are still more awkwardly adapted for walking. This whole tribe have all above the knee hid within the belly; and nothing appears but two short legs, or feet, as some would call them, that seem stuck under the rump, and upon which the animal is very awkwardly supported. They seem, when sitting or attempting to walk, like a dog that has been taught to sit up, or to move a minuet. Their short legs drive the body in progression from side to side; and were they not assisted by their wings, they could scarcely move faster than a tortoise.

This awkward position of the legs, which so unqualifies them for living upon land, adapts them admirably for a residence in water, in that, the legs placed behind the moving body, pushes it forward with greater velocity; and these birds, like Indian canoes, are the swiftest in the water, by having their paddles in the rear.

As they never visit land, except when they come to breed, their feathers take a colour from their situation. That part of them which has been continually bathed in the water, is white; while their backs and wings are of different colours, according to the different species. They are also covered more warmly all over the body with feathers, than any other birds whatever; so that the sea seems entirely their element.

The Magellanic Penguin, in size, approaches near that of a tame goose. They walk erect with their heads on high. their fin-like wings hanging down like arms; so that to see them at a distance, they look like so many children with white aprons. Hence they are said to unite in themselves the qualities of men, fowls, and fishes. Like men, they are upright; like fowls, they are feathered; and like fishes, they have fin-like instruments, that beat the water before, and serve for all the purposes of swimming rather than flying.

They feed upon fish; and seldom come ashore, except in the breeding season. Their flesh is rank and fishy; though our sailors say, that *it is pretty good eating*. In some the flesh

is so tough, and the feathers so thick, that they stand the blow of a scymitar without injury.

The penguin lays but one egg; and, in frequented shores, is found to burrow like a rabbit: sometimes three or four take possession of one hole, and hatch their young together. The egg of the penguin, as well as of all this tribe, is very large for the size of the bird, being generally found bigger than that of a goose. But as there are many varieties of the penguin, and as they differ in size, from that of a Muscovy duck to a swan, the eggs differ in the same proportion.

THE AUK, PUFFIN, AND OTHER BIRDS OF THE PENGUIN KIND.] Of a size far inferior to the penguin, but with nearly the same form, and exactly of the same appetites and manners, there is a very numerous tribe. The first of these is the Great **NORTHERN DIVER**, which is nearly of the size of a goose: it is beautifully variegated all over with many stripes, and differs from the penguin, in being much slenderer and more elegantly formed. The **Grey SPECKLED DIVER** does not exceed the size of a Muscovy duck; and, except in size, greatly resembles the former. The **AUK** breeds on the island of St. Kilda, and chiefly differs from the penguin in size and colour. It is smaller than a duck; and the whole of the breast and belly, as far as the middle of the throat, is white. The **GUILLEMOT** is about the same size; it differs from the auk, in having a longer, a slenderer, and a straighter bill. The **Scarlet Throated Diver** may be distinguished by its name; and the **PUFFIN** or **Coulterneb**, is one of the most remarkable birds we know.

Words cannot easily describe the form of the bill of the puffin, which differs so greatly from that of any other bird. Those who have seen the coulter of a plough, may form some idea of the beak of this odd-looking animal. It is flat; but, very different from that of the duck, its edge is upwards. It is of a triangular figure, and ending in a sharp point. It is of two colours; ash-coloured near the base, and red towards the point. It has three furrows or grooves impressed in it; one in the livid part, two in the red. The eyes are fenced with a protuberant skin, of a livid colour; and they are grey or ash-coloured.

The puffin, like all the rest of this kind, has its legs thrown so far back, that it can hardly move without tumbling. This makes it rise with difficulty, and subject to
many

The Grebe *p. 410*



The Puffin or Coulterneb *p. 418*



The Pelican *p. 411*



many falls before it gets upon the wing ; but as it is a small bird, not much bigger than a pigeon, when it once rises, it can continue its flight with great celerity.

Both this and all the former build no nest ; but lay their eggs either in the crevices of rocks, or in holes under ground near the shore. They chiefly choose the latter situation ; for the puffin, the auk, the guillemot, and the rest, cannot easily rise to the nest when in a lofty situation.

All the winter these birds are absent, visiting regions too remote for discovery. At the latter end of March, or the beginning of April, come over a troop of their spies or harbingers, that stay two or three days, as it were to view and search out for their former situations, and see whether all be well. This done, they once more depart ; and, about the beginning of May, return again with the whole army of their companions. But if the season happens to be stormy and tempestuous, and the sea troubled, the unfortunate voyagers undergo incredible hardships ; and they are found, by hundreds, cast away upon the shores, lean and perished with famine

The puffin, when it prepares for breeding, which always happens a few days after its arrival, begins to scrape up an hole in the ground not far from the shore ; and when it has some way penetrated the earth, it then throws itself upon its back, and with bill and claws thus burrows inward, till it has dug a hole with several windings and turnings, from eight to ten feet deep. It particularly seeks to dig under a stone, where it expects the greatest security. In this fortified retreat it lays one egg ; which, though the bird be not much bigger than a pigeon, is of the size of a hen's.

Few birds or beasts will venture to attack them in their retreats. When the great sea-raven comes to take away their young, the puffins boldly oppose him. Their meeting affords a most singular combat. As soon as the raven approaches, the puffin catches him under the throat with its beak, and sticks its claws into his breast, which makes the raven, with a loud screaming, attempt to get away ; but the little bird still holds fast to the invader, nor lets him go till they both come to the sea, where they drop down together, and the raven is drowned : yet the raven is but too often successful ; and invading the puffin at the bottom of its hole, devours both the parent and its family.

THE GOOSEANDER is a bird with the body and wing shaped like those of the penguin kind, but with legs not hid

in the belly. It may be distinguished from all others by its bill, which is round, hooked at the point, and toothed, both upper and under chap, like a saw. Its colours are various and beautiful: however, its manners and appetites entirely resemble those of the diver. It feeds upon fish, for which it dives; and is said to build its nest upon trees, like the heron and the cormorant. It seems to form the shade between the penguin and the goose kind: having a round bill, like the one; and unembarrassed legs, like the other. In the shape of the head, neck, and body, it resembles them both.

THE SWAN, THE GOOSE, AND THE DUCK.] Though these birds do not reject animal food when offered them, yet they can contentedly subsist upon vegetables, and seldom seek any other. They are easily provided for; wherever there is water, there seems to be plenty. All the other web-footed tribes are continually voracious, continually preying. These lead more harmless lives: the weeds on the surface of the water, or the insects at the bottom, the grass by the bank, or the fruits and corn in cultivated grounds, are sufficient to satisfy their easy appetites.

They breed in great abundance, and lead their young to the pool the instant they are excluded.

As their food is simple, so their flesh is nourishing and wholesome. The swan was considered as a high delicacy among the ancients; the goose was abstained from as totally indigestible. Modern manners have inverted tastes; the goose is now become the favourite; and the swan is seldom brought to table unless for the purposes of ostentation. But at all times the flesh of the duck was in high esteem; the ancients thought even more highly of it than we do. We are contented to eat it as a delicacy; they also considered it as a medicine; and Plutarch assures us, that Cato kept his whole family in health, by feeding them with duck whenever they threatened to be out of order.

No bird makes a more indifferent figure upon land, or a more beautiful one in the water, than the *Swan*. This fine bird has long been rendered domestic. The wild swan, though so strongly resembling this in colour and form, is yet a different bird; for it is very differently formed within. The wild swan is less than the tame almost a fourth; for as the one weighs twenty pounds, the other only weighs sixteen pounds and three quarters. The colour of the tame swan is all over white; that of the wild bird is, along the back
and

nd the tips of the wings, of ash-colour. But these are slight differences, compared to what are found upon dissection.

This beautiful bird is as delicate in its appetites, as elegant in its form. Its chief food is corn, bread, herbs growing in the water, and roots and seeds, which are found near the margin. It prepares a nest in some retired part of the bank, and chiefly where there is an islet in the stream. It is composed of water-plants, long grass, and sticks. The swan lays seven or eight eggs, white, much larger than those of a goose, with a hard shell. It sits near two months before its young are excluded; which are ash-coloured when they first leave the shell, and for some months after.

All the stages of this bird's approach to maturity are slow, and seem to mark its longevity. It is two months hatching; a year in growing to its proper size. The swan is said to be remarkable for its longevity. A goose has been known to live an hundred years; and the swan, from its superior size, and from its harder, firmer flesh, may naturally be supposed to live still longer.

THE GOOSE, in its domestic state, exhibits a variety of colours. The wild goose always retains the same marks: the whole upper part is ash-coloured; the breast and belly are of a dirty white; the bill is narrow at the base, and at the tip it is black; the legs are of a saffron colour, and the claws black.

The wild goose is supposed to breed in the northern parts of Europe; and, in the beginning of winter, to descend into more temperate regions. If they come to the ground by day, they range themselves in a line, like cranes; and seem rather to have descended for rest, than for other refreshment. When they have sat in this manner for an hour or two, I have heard one of them, with a loud long note, sound a kind of charge, to which the rest punctually attended, and they pursued their journey with renewed alacrity. Their flight is very regularly arranged: they either go in a line a-breast, or in two lines, joining in an angle in the middle.

THE BARNACLE differs in some respects from both these; being less than either, with a black bill, much shorter than either of the preceding. It is scarce necessary to combat the idle error of this bird's being bred from a shell sticking to ship's bottoms; it is well known to be hatched from an

egg, in the ordinary manner, and to differ in very few particulars from all the rest of its kind.

THE BRENT GOOSE is still less than the former, and not bigger than a Muscovy duck, except that the body is longer. The head, neck, and upper part of the breast, are black; about the middle of the neck, on each side, are two small spots or lines of white, which together appear like a ring.

THE TAME DUCK is the most easily reared of all our domestic animals. The wild duck differs, in many respects, from the tame; and in them there is still greater variety than among the domestic kinds. Of the tame duck there are not less than ten different sorts; and of the wild, Brisson reckons above twenty. The most obvious distinction between wild and tame ducks is in the colour of their feet; those of the tame duck being black; those of the wild duck yellow. The difference between wild ducks among each other, arises as well from their size as the nature of the place they feed in. Sea-ducks, which feed in the salt-water, and dive much, have a broad bill, bending upwards, a large hind toe, and a long blunt tail. Pond-ducks, which feed in plashees, have a straight and narrow bill, a small hind toe, and a sharp pointed train. The former are called, by our decoy-men, foreign ducks; the latter are supposed to be natives of England. In this tribe, we may rank, as natives of our own European dominions, the *Eider Duck*, which is double the size of a common duck, with a black bill; the *Velvet Duck*, not so large, and with a yellow bill; the *Scoter*, with a knob at the base of a yellow bill; the *Tufted Duck*, adorned with a thick crest; the *Scaup Duck*, less than the common Duck, with the bill of a greyish blue colour; the *Golden Eye*, with a large white spot at the corners of the mouth, resembling an eye; the *Sheldrake*, with the bill of a bright red, and swelling into a knob; the *Mallard*, which is the stock whence our tame breed has probably been produced; the *Pintail*, with the two middle feathers of the tail three inches longer than the rest; the *Pochard*, with the head and neck of a bright bay; the *Widgeon*, with a lead-coloured bill, and the plumage of the back marked with narrow black and white undulated lines, but best known by its whistling sound: lastly, the *Teal*, which is the smallest of this kind, with the bill black, the head and upper part of the neck of a bright bay. These are the most common birds of the duck kind among ourselves;

selves; but who can describe the amazing variety of this tribe, if he extends his view to the different quarters of the world? The most noted of the foreign tribe are, the *Muscovy Duck*, or, more properly speaking, the *Musk Duck*, so called from a supposed musky smell, with naked skin round the eyes, and which is a native of Africa. The *Brasilian Duck*, which is of the size of a goose, all over black except the tips of the wings. The *American Wood Duck*, with a variety of beautiful colours, and a plume of feathers which falls from the back of the head like a friar's cowl. These, and twenty others, might be added, were encreasing the number of names the way to enlarge the sphere of our comprehension.

All these live in the manner of our domestic ducks, keeping together in flocks in the winter, and flying in pairs in summer, bringing up their young by the water-side, and leading them to their food as soon as out of the shell. Their nests are usually built among heath or rushes, not far from the water; and they lay twelve, fourteen, or more eggs before they sit; yet this is not always their method; the dangers they continually encounter from their situation, sometimes obliges them to change their manner of building; and their awkward nests are often seen exalted on the tops of trees. This must be a very great labour to perform, as the duck's bill is but ill-formed for building a nest, and giving the materials of which it is composed a sufficient stability to stand the weather. The nest, whether high or low, is generally composed of the longest grass, mixed with heath, and is lined within with the bird's own feathers. The eider duck is particularly remarkable for the warmth of its nest. This bird, which, as was said, is above twice as large as the common duck, and resides in the colder climates, lays from six to eight eggs, making her nest among the rocks or the plants along the sea-shore. The external materials of the nest are such as are in common with the rest of the kind; but the inside lining, on which the eggs are immediately deposited, is at once the softest, warmest, and the lightest substance with which we are acquainted. This is no other than the inside down which covers the breast of the bird in the breeding season. This the female plucks off with her bill, in order to line the inside of her nest. The natives watch the place where she begins to build, and suffering her to lay, take away both the eggs and the nest. The duck, however, not discouraged by the first disappointment, builds and lays in the same place a

second time, and this they in the same manner take away : the third time she builds, but the drake must supply the down from his breast to line the nest with : and, if this be robbed, they both forsake the place, and breed there no more. This down the natives take care to separate from the dirt and moss with which it is mixed ; and, though no people stand in more need of a warm covering than themselves, yet their necessities compel them to sell it to the more indolent and luxurious inhabitants of the south, for brandy and tobacco.

As these animals possess the faculties of flying and swimming, so they are in general birds of passage, and it is most probable perform their journies across the ocean as well on the water as in the air. Those that migrate to this country, on the approach of winter, are seldom found so well tasted or so fat as the fowls that continue with us the year round : their flesh is often lean, and still oftener fishy ; which flavour it has probably contracted in the journey, as their food in the lakes of Lapland, whence they descend, is generally of the insect kind.

As soon as they arrive among us, they are generally seen flying in flocks to make a survey of those lakes where they intend to take up their residence for the winter. Lakes, with a marsh on one side, and a wood on the other, are seldom without vast quantities of wild fowl. The greatest quantities are taken in decoys ; which, though well known near London, are yet untried in the remoter parts of the country. The manner of making and managing a decoy is as follows

A place is to be chosen for this purpose far remote from the common highway, and all noise of people. When the place is chosen, the pool, if possible, is to be planted round with willows, unless a wood answers the purpose of shading it on every side. On the south and north side of this pool are two, three, or four ditches or channels, made broad towards the pool, and growing narrower till they end in a point. These channels are to be covered over with nets, supported by hooped sticks bending from one side to the other ; so that they form a vault or arch growing narrower and narrower to the point, where it is terminated by a tunnel-net, like that in which fish are caught in weirs. Along the banks of these channels so netted over, which are called pipes, many hedges are made of reeds slanting to the edge of the channel, the acute angles to the side next the pool. The whole apparatus also is to be hidden from the pool by a hedge

of reeds along the margin, behind which the fowler manages his operations. The place being fitted in this manner, the fowler is to provide himself with a number of wild ducks made tame, which are called decoys. These are always to be fed at the mouth or entrance of the pipe, and to be accustomed to come at a whistle.

As soon as the evening is set in, *the decoy rises*, as they term it, and the wild fowl feed during the night. If the evening be still, the noise of their wings, during their flight, is heard at a very great distance, and produces no unpleasing sensation. The fowler, when he finds a fit opportunity, and sees his decoy covered with fowl, walks about the pool, and observes into what pipe the birds gathered in the pool may be enticed or driven. Then casting hemp-feed, or some such seed as will float on the surface of the water, at the entrance and up along the pipe, he whistles to his decoy ducks, who instantly obey the summons, and come to the entrance of the pipe, in hopes of being fed as usual. Thither also they are followed by a whole flock of wild ones, who little suspect the danger preparing against them. The wild ducks, therefore, pursuing the decoy ducks, are led into the broad mouth of the channel or pipe, nor have the least suspicion of the man who keeps hidden behind one of the hedges. When they have got up the pipe, however, finding it grow more and more narrow, they begin to suspect danger, and would return back; but they are now prevented by the man, who shews himself at the broad end below. Thither, therefore, they dare not return; and rise they may not, as they are kept by the net above from ascending. The only way left them, therefore, is the narrow-funnelled net at the bottom; into this they fly, and there they are taken.

It often happens, however, that the wild fowl are in such a state of sleepiness or dozing, that they will not follow the decoy ducks. Use is then generally made of a dog who is taught his lesson. He passes backward and forward between the reed-hedges, in which there are little holes, both for the decoy man to see, and for the little dog to pass through. This attracts the eye of the wild fowl; who, prompted by curiosity, advance towards this little animal, while he all the time keeps playing among the reeds, nearer and nearer the funnel, till they follow him too far to recede. Sometimes the dog will not attract their attention till a red handkerchief, or something very singular, be put about him. The decoy ducks never enter the funnel-net with the rest,
being

being taught to dive under water as soon as the rest are driven in.

To this manner of taking wild fowl in England, I will subjoin another still more extraordinary, frequently practised in China. Whenever the fowler sees a number of ducks settled in any particular plash of water, he sends off two or three gourds to float among them. These gourds resemble our pompions; but, being made hollow, they swim on the surface of the water; and on one pool there may sometimes be seen twenty or thirty of these gourds floating together. The fowl at first are a little shy of coming near them; but by degrees they come nearer; and as all birds at last grow familiar with a scare-crow, the ducks gather about these, and amuse themselves by whetting their bills against them. When the birds are as familiar with the gourds as the fowler could wish, he then prepares to deceive them in good earnest. He hollows out one of these gourds large enough to put his head in; and, making holes to breathe and see through, he claps it on his head. Thus accoutred, he wades slowly into the water, keeping his body under, and nothing but his head in the gourd above the surface; and in that manner moves imperceptibly towards the fowls, who suspect no danger. At last, however, he fairly gets in among them; while they, having been long used to see gourds, take not the least fright while the enemy is in the very midst of them; and an insidious enemy he is; for ever as he approaches a fowl, he seizes it by the legs, and draws it in a jerk under water. There he fastens it under his girdle, and goes to the next, till he has thus loaded himself with as many as he can carry away. When he has got his quantity, without ever attempting to disturb the rest of the fowls on the pool, he slowly moves off again; and in this manner pays the flock three or four visits in a day. Of all the various artifices for catching fowl, this seems likely to be attended with the greatest success, as it is the most practised in China.

OF THE KING-FISHER.] I will conclude this history of birds, with one that seems to unite in itself somewhat of every class preceding.

The king-fisher is not much larger than a swallow; its shape is clumsy; the legs disproportionably small, and the bill disproportionably long; it is two inches from the base to the tip; the upper chap black, and the lower yellow; but the colours of this bird atone for its inelegant form; the crown of the head and the coverts of the wings are of a deep blackish

blackish green, spotted with bright azure; the back and tail are of the most resplendent azure; the whole under side of the body is orange coloured; a broad mark of the same passes from the bill beyond the eyes; beyond that is a large white spot: the tail is short, and consists of twelve feathers of a rich deep blue; the feet are of a reddish yellow, and the three joints of the outmost toe adhere to the middle toe, while the inner toe adheres only by one.

From the diminutive size, the slender short legs, and the beautiful colours of this bird, no person would suppose it one of the most rapacious little animals that skims the deep. Yet it is for ever on the wing, and feeds on fish, which it takes in surprising quantities, when we consider its size and figure. It chiefly frequents the banks of rivers, and takes its prey after the manner of the osprey, balancing itself at a certain distance above the water for a considerable space, then darting into the deep, and seizing the fish with inevitable certainty. While it remains suspended in the air, in a bright day, the plumage exhibits a beautiful variety of the most dazzling and brilliant colours.

The king-fisher builds its nest by the river-side in a hole which it burrows out itself, or in the deserted hole of a rat. In these holes, which, from the remains of fish brought there, are very foetid, the king-fisher is often found with from five eggs to nine. There the female continues to hatch even though disturbed; and though the nest be robbed, she will again return and lay there. The male, whose fidelity exceeds even that of the turtle, brings her large provisions of fish while she is thus employed; and she, contrary to most other birds, is found plump and fat at that season.

The ancients have had their fables concerning this bird, and so have the modern vulgar. It is an opinion generally received among them, that the flesh of the king-fisher will not corrupt, and that it will even banish all vermin. This has no better foundation than that which is said of its always pointing, when hung up dead, with its breast to the north. The only truth which can be affirmed of this bird when killed is, that its flesh is utterly unfit to be eaten; while its beautiful plumage preserves its lustre longer than that of any other bird we know.

C H A P. XXIX.

Of Fishes in general.—Of Cetaceous Fishes.—The Whale.—The Sword Fish.—The Narwhale, or Unicorn.—The Spermaceti Whale.—The Dolphin.—Grampus, Porpesse, &c.

THE number of fish to which we have given names, and with the figure of which at least we are a little acquainted, is, according to Linnæus, above four hundred. The majority of these are confined to the sea, and would expire in the fresh water, though there are a few which annually swim up the rivers, to deposit their spawn.

The chief instruments of a fish's motion are, the fins, which in some fish are more numerous than in others. The fish, in a state of repose, spreads all its fins, and seems to rest upon its pectoral * and ventral † fins near the bottom : if the fish folds up, for it has the power of folding, either of its pectoral fins, it inclines to the same side ; folding the right pectoral fin, the fish inclines to the right side ; folding the left fin, it inclines to that side in turn. When the fish desires to have a retrograde motion, striking with the pectoral fins, in a contrary direction, effectually produces it. If the fish desires to turn, a blow from the tail sends it about ; but if the tail strikes both ways, then the motion is progressive. In pursuance of these observations, if the dorsal ‡ and ventral fins be cut off, the fish reels to the right and left, and endeavours to supply its loss by keeping the rest of its fins in constant employment. If the right pectoral fin be cut off, the fish leans to that side ; if the ventral fin on the same side be cut away, then it loses its equilibrium entirely. When the tail is cut off, the fish loses all motion, and gives itself up to where the water impels it.

The senses of fishes are remarkably imperfect, and, indeed, that of sight is almost the only one which, in general, they may be truly said to possess. But this is, in some degree, compensated by their astonishing longevity, several species being known to live for more than an hundred years. Their longevity is still exceeded by their singular fecundity ; for a single cod, for instance, produces at a birth, as many young ones as there are inhabitants in all Great-Britain, above nine millions. The flounder produces at once above a million, and the mackarel five hundred thousand.

* Those near the gills.

† The belly fins.

‡ Back fins.

The spawn continues in its egg state in some fishes longer than in others, and this generally in proportion to their size. The young of the salmon continues in egg from December to April; the carp, three weeks, and the little gold-fish, from China, is produced still quicker. The young spawn are the prey of all the inhabitants of the water, even of their own parents, and scarcely one in a thousand escapes the numerous perils of its youth.

Such is the general picture of these heedless and hungry creatures; but there are some in this class, living in the waters, that are possessed of finer organs and higher sensations; that have all the tenderness of birds or quadrupeds for their young; that nurse them with constant care, and protect them from every injury. Of this class are the *Cetaceous* tribe, or the fishes of the whale kind. There are others, though not capable of nursing their young, yet that bring them alive into the world, and defend them with courage and activity. These are the *Cartilaginous* kinds, or those who have gristles instead of bones. But the fierce unmindful tribe we have been describing, that leave their spawn without any protection, are called the *Spinous* or bony kinds, from their bones resembling the sharpness of thorns.

OF CETACEOUS FISHES.] This tribe is composed of the *Whale* and its varieties, of the *Cachalot*, the *Dolphin*, the *Grampus*, and the *Porpoise*. All these resemble quadrupeds in their internal structure, and in some of their appetites and affections. Like quadrupeds, they have lungs, a midriff, a stomach, intestines, liver, spleen, bladder, and parts of generation; their heart also resembles that of quadrupeds, with its partitions closed up as in them, and driving red and warm blood in circulation through the body; and to keep these parts warm, the whole kind are also covered between the skin and the muscles with a thick coat of fat or blubber.

As these animals breathe the air, it is obvious that they cannot bear to be any long time under water. They are constrained, therefore, every two or three minutes, to come up to the surface to take breath, as well as to spout out through their nostril, for they have but one, that water which they sucked in while gaping for their prey.

But it is in the circumstances in which they continue their kind, that these animals shew an eminent superiority. Other fish deposit their spawn, and leave the success to accident; these never produce above one young, or two at the most; and this the female suckles entirely in the manner of quadrupeds.

drupeds, her breasts being placed, as in the human kind, above the navel. Their tails also are different from those of all other fish: they are placed so as to lie flat on the surface of the water; while the other kinds have them, as we every day see, upright or edgeways. This flat position of the tail enables them to force themselves suddenly to the surface of the water to breathe, which they are continually constrained to do.

THE WHALE.] Of the whale, properly so called, there are no less than seven different kinds; all distinguished from each other by their external figure, or internal conformation. The Great Greenland Whale, without a back-fin, and black on the back; the Iceland Whale, without a back-fin, and whitish on the back; the New England Whale, with a hump on the back; the Whale with six humps on the back; the Fin-fish, with a fin on the back near the tail; the Pike-headed Whale, and the Round-lipped Whale. All these differ from each other in figure, as their names obviously imply. They differ also somewhat in their manner of living; the fin-fish having a larger swallow than the rest; being more active, slender, and fierce, and living chiefly upon herrings.

The Great Greenland Whale is the fish, for taking which there are such preparations made in different parts of Europe. It is a large heavy animal, and the head alone makes a third of its bulk. It is usually found from sixty to seventy feet long. The fins on each side are from five to eight feet, composed of bones and muscles, and sufficiently strong to give the great mass of body which they move, speed, and activity. The tail is about twenty-four feet broad; and, when the fish lies on one side, its blow is tremendous. The skin is smooth and black, and, in some places, marbled with white and yellow; which, running over the surface, has a very beautiful effect.

The outward or scarf skin of the whale is no thicker than parchment; but this removed, the real skin appears, of about an inch thick, and covering the fat or blubber that lies beneath: this is from eight to twelve inches in thickness; and is, when the fish is in health, of a beautiful yellow. The muscles lie beneath; and these, like the flesh of quadrupeds, are very red and tough.

The cleft of the mouth is above twenty feet long, which is near one third of the animal's whole length; and the upper jaw is furnished with barbs, that lie, like the pipes of an organ, the greatest in the middle, and the smallest on the sides.

These

These compose the whale-bone, the longest spars of which are found to be not less than eighteen feet. The tongue is almost immoveably fixed to the lower jaw, seeming one great lump of fat; and, in fact, it fills several hog'sheads with blubber. The eyes are not larger than those of an ox; and when the crystalline humour is dried, it does not appear larger than a pea. They are placed towards the back of the head, being the most convenient situation for enabling them to see both before and behind; as also to see over them, where their food is principally found. They are guarded by eye-lids and eye-lashes, as in quadrupeds; and they seem to be very sharp-sighted.

Nor is their sense of hearing in less perfection; for they are warned, at great distances, of any danger preparing against them. We have already observed, that the substance, called whalebone, is taken from the upper jaw of the animal, and is very different from the real bones of the whale. The real bones are hard, like those of great land animals, are very porous, and filled with marrow. Two great strong bones sustain the under lip, lying against each other in the shape of an half-moon: some of these are twenty feet long; they are seen in several gardens set up against each other, and are usually mistaken for the ribs.

The fidelity of these animals to each other exceeds whatever we are told of even the constancy of birds. Some fishers, as Anderson informs us, having struck one of two whales, a male and a female, that were in company together, the wounded fish made a long and terrible resistance: it struck down a boat with three men in it, with a single blow of the tail, by which all went to the bottom. The other still attended its companion, and lent it every assistance; till, at last, the fish that was struck, sunk under the number of its wounds; while its faithful associate, disdaining to survive the loss, with great bellowing, stretched itself upon the dead fish, and shared his fate.

The whale goes with young nine or ten months, and is then fatter than usual, particularly when near the time of bringing forth. The young ones continue at the breast for a year; during which time they are called by the sailors *short-heads*. They are then extremely fat, and yield above fifty barrels of blubber. The mother, at the same time, is equally lean and emaciated. At the age of two years they are called *stunts*, as they do not thrive much immediately after quitting the breast: they then yield scarce above twenty, or twenty-four, barrels of blubber: from that time forward they

they are called *skull-fish*, and their age is wholly unknown. The food of the whale is a small insect which is seen floating in those seas, and which Linnæus terms the *Medusa*. These insects are black, and of the size of a small bean, and are sometimes seen floating in clusters on the surface of the water. They are of a round form, like snails in a box, but they have wings, which are so tender that it is scarce possible to touch them without breaking. These, however, serve rather for swimming than flying. They have the taste of raw muscles, and have the smell of burnt sugar. Inoffensive as the whale is, it is not without enemies. There is a small animal, of the shell-fish kind, called the *Whale-louse*, that sticks to its body, as we see shells sticking to the foul bottom of a ship. This insinuates itself chiefly under the fins; and whatever efforts the great animal makes, it still keeps its hold, and lives upon the fat, which it is provided with instruments to arrive at.

The sword-fish, however, is the whale's most terrible enemy. "At the sight of this little animal," says Anderson, "the whale seems agitated in an extraordinary manner; leaping from the water as if with affright: wherever it appears, the whale perceives it at a distance, and flies from it in the opposite direction: I have been myself," continues he, "a spectator of their terrible encounter. The whale has no instrument of defence except the tail; with that it endeavours to strike the enemy; and a single blow taking place, would effectually destroy its adversary: But the sword-fish is as active as the other is strong, and easily avoids the stroke; then bounding into the air, it falls upon its enemy, and endeavours not to pierce with its pointed beak, but to cut with its toothed edges. The sea all about is soon dyed with blood, proceeding from the wounds of the whale; while the enormous animal vainly endeavours to reach its invader, and strikes with its tail against the surface of the water, making a report at each blow louder than the noise of a cannon."

There is still another and more powerful enemy called, by the fishermen of New England, the *killer*. This is itself a cetaceous animal, armed with strong and powerful teeth. A number of these are said to surround the whale, in the same manner as dogs get round a bull. Some attack it with their teeth behind; others attempt it before; until, at last, the great animal is torn down, and its tongue is said to be the only part they devour when they have made it their prey.

prey. They are said to be of such great strength, that one of them alone was known to stop a dead whale that several boats were towing along, and drag it from among them to the bottom.

But of all the enemies of these enormous fishes, man is the greatest: he alone destroys more in a year than the rest in an age, and actually has thinned their numbers in that part of the world where they are chiefly sought. For the purpose of whale fishing a number of large vessels are fitted out annually from different parts of Europe, and are stored with six months provision. When arrived at the part where the whales are expected to pass to the southward, they always keep their sails set, and a sailor is placed at the mast-head, to give information when he spies a whale. As soon as he discovers one, the whole crew are instantly in employment: they fit out their boats, and row away to where the whale was seen. The harpooner, who is to strike the fish, stands at the prow of the boat, with an harpoon or javelin in his hand, five or six feet long, pointed with steel like the barb of an arrow, of a triangular shape. As this person's place is that of the greatest dexterity, so also it is of the greatest danger: the whale sometimes overturns the boat with a blow of its tail, and sometimes drives against it with fury. In general, however, the animal seems to sleep on the surface of the water; while the boat approaching, the harpooner stands aloft, and, with his harpoon tied to a cord of several hundred fathom length, darts it into the animal, and then rows as fast as possible away. It is some time before the whale seems to feel the blow; the instrument has usually pierced no deeper than the fat, and that being insensible, the animal continues for a while motionless; but soon roused from its seeming lethargy, as the shaft continues to pierce deeper and deeper into the muscular flesh, it flies off with amazing rapidity. In the mean time, the harpoon sticks in its side; while the rope, which is coiled up in the boat, and runs upon a swivel, lengthens as the whale recedes, but still shews the part of the deep to which it has retreated. The cord is coiled up with great care; for such is the rapidity with which it runs off, that if it was but the least checked, as it yields with the animal's retreat, it would infallibly upset the boat, and the crew would go to the bottom. It sometimes happens also, that the rapidity with which it runs over the swivel at the edge of the boat, heats it, and it would infallibly take fire, did not a man stand continually with a wet mop in his hand, to cool the swivel as

the cord runs. The whale having dived to a considerable depth, remains at the bottom, sometimes for near half an hour, with the harpoon in its body, and then rises to take breath, expecting the danger to be over: but the instant it appears, they are all with their boats ready to receive it, and sling their harpoons into its body: the animal again dives and again rises, while they repeat their blows. The ship follows in full sail, like all the rest, never losing sight of the boats, and ready to lend them assistance; the whole ocean seems dyed in blood. Thus they renew their attack, till the whale begins to be quite enfeebled and spent, when they plunge their longer spears, into various parts of its body, and the enormous animal expires. When it is dead, to prevent it from sinking, they tie it with a strong iron chain to the side of the boat, and either cut it up in pieces, and carry it home in that manner, or extract the oil from the blubber on ship-board.

The flesh of this animal is a dainty to some nations; and the savages of Greenland, as well as those near the south pole, are fond of it to distraction. They eat the flesh, and drink the oil, which is a first-rate delicacy. The finding a dead whale is an adventure considered among the fortunate circumstances of their wretched lives. They make their abode beside it; and seldom remove till they have left nothing but the bones.

THE NARWHAL, OR SEA-UNICORN is not so large as the whale, not being above sixty feet long. Its body is slenderer than that of the whale, and its fat not in so great abundance. But this great animal is sufficiently distinguished from all others of the deep by its tooth or teeth, which stand pointing directly forward from the upper jaw, and are from nine to fourteen feet long. In all the variety of weapons with which Nature has armed her various tribes, there is not one so large or so formidable as this. This terrible weapon is generally found single; and some are of opinion that the animal is furnished with but one by nature; but there is at present the skull of a narwhal at the Stadthouse at Amsterdam with two teeth. The tooth, or, as some are pleased to call it, the horn of the narwhal, is as straight as an arrow, about the thickness of the small of a man's leg, wreathed in the manner we sometimes see twisted bars of iron; it tapers to a sharp point; and is whiter, heavier, and harder than ivory. It is generally seen to spring from the left side of the head directly forward in a straight line with the body; and

and its root enters into the socket above a foot and an half. Notwithstanding its appointments for combat, these long and pointed tusks, amazing strength, and unmatchable celerity, the narwhal is one of the most harmless and peaceful inhabitants of the ocean. It is seen constantly and inoffensively sporting among the other great monsters of the deep, no way attempting to injure them, but pleased in their company. The Greenlanders call the narwhal the fore-runner of the whale; for wherever it is seen, the whale is shortly after sure to follow. This may arise as well from the natural passion for society in these animals, as from both living upon the same food, which are the insects described in the preceding chapter. These powerful fishes make war upon no other living creature; and, though furnished with instruments to spread general destruction, are as innocent and as peaceful as a drove of oxen. The narwhal is much swifter than the whale, and would never be taken by the fisherman but for those very tusks, which at first appear to be its principal defence. These animals, are always seen in herds of several at a time; and whenever they are attacked, they crowd together in such a manner, that they are mutually embarrassed by their tusks. By these they are often locked together, and are prevented from sinking to the bottom. It seldom happens, therefore, but the fishermen make sure of one or two of the hindmost, which very well reward their trouble.

THE CACHALOT, OR SPERMACETI WHALE, has several teeth in the under jaw, but none in the upper. As there are no less than seven distinctions among whales, so also there are the same number of distinctions in the tribe we are describing. This tribe is not of such enormous size as the whale, properly so called, not being above sixty feet long and sixteen feet high. In consequence of their being more slender, they are much more active than the common whale; they remain a longer time at the bottom, and afford a smaller quantity of oil. As in the common whale the head was seen to make a third part of its bulk, so in this species the head is so large as to make one half of the whole. The cachalot is as destructive among lesser fishes as the whale is harmless; and can at one gulp swallow a shoal of fishes down its enormous gullet. Linnæus tells us that this fish pursues and terrifies the dolphins and porpoises so much, as often to drive them on shore.

But, how formidable soever this fish may be to its fellows of the deep, it is by far the most valuable, and the most sought after by man, as it contains two very precious drugs, spermaceti and ambergrise, the whole oil of the fish is very easily convertible into spermaceti. This is performed by boiling it with a lea of pot-ash, and hardening it in the manner of soap. Candles are now made of it, which are substituted for wax, and sold much cheaper.

As to the ambergrise which is sometimes found in this whale, it was long considered as a substance found floating on the surface of the sea; but time, that reveals the secrets of the mercenary, has discovered that it chiefly belongs to this animal. The name, which has been improperly given to the former substance, seems more justly to belong to this; for the ambergrise is found in the place where the seminal vessels are usually situated in other animals. It is found in a bag of three or four feet long, in round lumps, from one to twenty pounds weight, floating in a fluid rather thinner than oil, and of a yellowish colour. There are never seen more than four at a time in one of these bags; and that which weighed twenty pounds, and which was the largest ever seen, was found single. These balls of ambergrise are not found in all fishes of this kind, but chiefly in the oldest and strongest.

THE DOLPHIN, THE GRAMPUS, AND THE PORPESSE,]

All these fish have teeth both in the upper and the lower jaw, and are much less than the whale. The grampus, which is the largest, never exceeds twenty feet. It may also be distinguished by the flatness of its head, which resembles a boat turned upside down. The porpesse resembles the grampus in most things, it is seldom above eight feet long; its snout also more resembles that of an hog. The dolphin has a strong resemblance to the porpesse, except that its snout is longer and more pointed. They have all fins on the back; they all have heads very large, like the rest of the whale kind; and resemble each other in their appetites, their manners, and conformations; being equally voracious, active, and roving.

The great agility of these animals prevents their often being taken. They seldom remain a moment above water; sometimes, indeed, their too eager pursuits expose them to danger; and a shoal of herrings often allures them out of their depth. In such a case, the hungry animal continues

to flounder in the shallows till knocked on the head, or till the retiring tide seasonably comes to its relief. But all this tribe, and the dolphin in particular, are not less swift than destructive. No fish could escape them, but from the awkward position of the mouth, which is placed in a manner under the head: yet, even with these disadvantages, their depredations are so great, that they have been justly stiled the plunderers of the deep.

As for the rest, we are told, that these animals go with young ten months; that, like the whale, they seldom bring forth above one at a time, and that in the midst of summer: that they live to a considerable age; though some say not above twenty-five or thirty years; and they sleep with the snout above water.

CHAP. XXX.

Of Cartilaginous Fishes in general.—Of the Shark kind.—Of the Ray kind.—The Skate.—The Thornback.—Manner of fishing for them.—The rough Ray.—The Fire-flare.—The Torpedo.—The Lamprey.—The Sturgeon.—The Isinglass-fish.—The Sun-fish.—The Fishing-frog.—The Lump-fish.—The Sea-snail.—The Pipe-fish.—The Hippocampus.—The Sea-orb.—The Sea-hedge-hog.—The Galley-fish.

THE first great distinction which the cartilaginous tribe of fishes exhibit is, in having cartilages or gristles instead of bones. The size of all fishes encreases with age; but from the pliancy of the bones in this tribe, they seem to have no bounds placed to their dimensions: and it is supposed that they grow larger every day till they die.

Cartilaginous fishes unite the principal properties of both the other classes in their conformation: like the cetaceous tribes, they have organs of hearing, and lungs; like the spinous kinds, they have gills, and an heart without a partition.

From this structure of their gills, these animals are enabled to live a longer time out of water than other fishes. The cartilaginous shark, or ray, live some hours after they are taken; while the spinous herring or mackarel expire a few minutes after they are brought on shore. Some of this class bring forth their young alive; and some bring forth eggs, which are afterwards brought to maturity. In all, however, the manner of gestation is nearly the same; for upon dissection, it is ever found, that the young, while in

the body, continue in the egg till a very little time before they are excluded: these eggs they may properly be said to hatch within their body; and as soon as their young quit the shell, they begin to quit the womb also.

OF THE SHARK KIND.] Of all the inhabitants of the deep, those of the shark kind are the fiercest and the most voracious:

THE WHITE SHARK is sometimes seen to rank even among whales for magnitude; and is found from twenty to thirty feet long. Some assert that they have seen them of four thousand pound weight; and we are told particularly of one, that had a human corpse in his belly. The head is large, and somewhat flattened; the snout long, and the eyes large. The mouth is enormously wide; as is the throat, and capable of swallowing a man with great ease. But its furniture of teeth is still more terrible. Of these there are six rows, extremely hard, sharp-pointed, and of a wedge-like figure. It is asserted that there are seventy-two in each jaw, which make one hundred and forty-four in the whole; yet others think that their number is uncertain; and that, in proportion as the animal grows older, these terrible instruments of destruction are found to encrease. With these the jaws both above and below appear planted all over; but the animal has a power of erecting or depressing them at pleasure. When the shark is at rest, they lie quite flat in his mouth; but when he prepares to seize his prey, he erects all this dreadful apparatus, by the help of a set of muscles that join them to the jaw; and the animal he seizes, dies pierced with an hundred wounds in a moment.

Nor is this fish less terrible to behold as to the rest of his form: his fins are larger, in proportion; he is furnished with great goggle eyes, that he turns with ease on every side, so as to see his prey behind him as well as before: and his whole aspect is marked with a character of malignity; his skin also is rough, hard and prickly; being that substance which covers instrument cases, called shagreen.

No fish can swim so fast as the shark, he outstrips the swiftest ships. Such amazing powers, with such great appetites for destruction, would quickly unpeople even the ocean, but providentially the shark's upper jaw projects so far above the lower, that he is obliged to turn on one side (not on his back, as is generally supposed) to seize his prey. As this takes some small time to perform, the animal pursued seizes that opportunity to make its escape.

Still,

Still, however, the depredations he commits are frequent and formidable. The shark is the dread of sailors in all hot climates; where, like a greedy robber, he attends the ships, in expectation of what may drop over board. A man who unfortunately falls into the sea at such a time, is sure to perish. A sailor that was bathing in the Mediterranean, near Antibes, in the year 1744, while he was swimming about fifty yards from the ship, perceived a monstrous fish making towards him and surveying him on every side, as fish are often seen to look round a bait. The poor man, struck with terror at its approach, cried out to his companions in the vessel to take him on board. They accordingly threw him a rope with the utmost expedition, and were drawing him up by the ship's side, when the shark darted after him from the deep, and snapped off his leg.

Mr. Pennant tells us, that the master of a Guinea-ship, finding a rage for suicide prevail among his slaves, from a notion the unhappy creatures had, that after death they should be restored again to their families, friends and country; to convince them at least that some disgrace should attend them here, he ordered one of their dead bodies to be tied by the heels to a rope, and so let down into the sea; and though it was drawn up again with great swiftness, yet, in that short space, the shark had bitten off all but the feet. A Guinea captain was, by stress of weather, driven into the harbour of Belfast, with a lading of very sickly slaves, who, in the manner above-mentioned, took every opportunity to throw themselves over board when brought upon deck, as is usual, for the benefit of the fresh air. The captain perceiving, among others, a woman slave attempting to drown herself, pitched upon her as a proper example to the rest: as he supposed that they did not know the terrors attending death, he ordered the woman to be tied with a rope under the arm-pits, and so let her down into the water. When the poor creature was thus plunged in, and about half way down, she was heard to give a terrible shriek, which at first was ascribed to her fears of drowning; but soon after the water appearing red all round her, she was drawn up, and it was found that a shark, which had followed the ship, had bit her off from the middle.

The usual method of our sailors to take the shark, is by baiting a great hook with a piece of beef or pork, which is thrown out into the sea by a strong cord, strengthened near the hook with an iron chain. Without this precaution, the shark would quickly bite the cord in two, and thus set him-

self free. It is no unpleasant amusement to observe this voracious animal coming up to survey the bait, particularly when not pressed by hunger. He approaches it, examines it, swims round it, seems for a while to neglect it, perhaps apprehensive of the cord and the chain: he quits it for a little; but his appetite pressing, he returns again; appears preparing to devour it, but quits it once more. When the sailors have sufficiently diverted themselves with his different evolutions, they then make a pretence, by drawing the rope, as if intending to take the bait away; it is then that the glutton's hunger excites him; he darts at the bait, and swallows it, hook and all. Sometimes, however, he does not so entirely gorge the whole, but that he once more gets free; yet even then, though wounded and bleeding with the hook, he will again pursue the bait until he is taken. When he finds the hook lodged in his maw, his utmost efforts are then excited, but in vain to get free; he tries with his teeth to cut the chain; he pulls with all his force to break the line; he almost seems to turn his stomach inside out, to disgorge the hook; in this manner he continues his formidable though fruitless efforts; till quite spent, he suffers his head to be drawn above water, and the sailors confining his tail by a noose, in this manner draw him on ship board, and dispatch him. This is done by beating him on the head till he dies; yet even that is not effected without difficulty and danger; the enormous creature, terrible even in the agonies of death, still struggles with his destroyers; nor is there an animal in the world that is harder to be killed. Even when cut in pieces, the muscles still preserve their motion, and vibrate for some minutes after being separated from the body. Another method of taking him, is by striking a barbed instrument, called a sizgig, into his body, as he brushes along by the side of the ship. As soon as he is taken up, to prevent his flouncing, they cut off the tail with an ax, with the utmost expedition.

This is the manner in which Europeans destroy the shark; but some of the negroes along the African coast, take a bolder and more dangerous method to combat their terrible enemy. Armed with nothing more than a knife, the negroe plunges into the water, where he sees the shark watching for his prey, and boldly swims forward to meet him; though the great animal does not come to provoke the combat, he does not avoid it, and suffers the man to approach him, but just as he turns upon his side to seize the aggressor, the negroe watches the opportunity, plunges his knife in the fish's belly, and pursues

pursues his blows with such success, that he lays the ravenous tyrant dead at the bottom: he soon however returns, fixes the fish's head in a noose, and drags him to shore, where he makes a noble feast for the adjacent villages.

Nor is man alone the only enemy this fish has to fear: the remora, or sucking fish, is probably a still greater, and follows the shark every where. This fish has got a power of adhering to whatever it sticks against, in the same manner as a cupping-glass sticks to the human body. It is by such an apparatus that this animal sticks to the shark, drains away its moisture, and produces a gradual decay.

CARTILAGINOUS FISHES OF THE RAY KIND.] The whole of this kind resemble each other very strongly in their figure; nor is it easy without experience to distinguish one from another. The stranger to this dangerous tribe may imagine he is only handling a skate when he is instantly struck numb by the torpedo; and he may suppose he has caught a thornback till he is stung by the fire-flare.

It is by the spines that these animals are distinguished from each other. The skate has the middle of the back rough, and a single row of spines on the tail. The sharp nosed ray has ten spines that are situated towards the middle of the back. The rough ray has its spines spread indiscriminately over the whole back. The thorn-back has its spines disposed in three rows upon the back. The fire-flare has but one spine, but that indeed a terrible one. This dangerous weapon is placed on the tail, about four inches from the body, and is not less than five inches long. It is of a flinty hardness, the sides thin, sharp pointed, and closely and sharply bearded the whole way. The last of this tribe that I shall mention is the torpedo; and this animal has no spines that can wound; but in the place of them it is possessed of one of the most potent and extraordinary faculties in nature.

Of all the larger fish of the sea, these are the most numerous; and they owe their numbers to their size. Except the white shark and cachalot alone, there is no other fish that has a swallow large enough to take them in; and their spines make them a still more dangerous morsel. Yet the size of some is such, that even the shark himself is unable to devour them: we have seen some of them in England weigh above two hundred pounds; but that is nothing to their enormous bulk in other parts of the world. Labat tells us of a prodigious ray that was speared by the negroes

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at Guadaloupe, which was thirteen feet eight inches broad, and above ten feet from the snout to the insertion of the tail. The tail itself was in proportion, for it was no less than fifteen feet long; twenty inches broad at its insertion, and tapering to a point. The body was two feet in depth; the skin as thick as leather, and marked with spots, which spots in all of this kind, are only glands, that supply a mucus to lubricate and soften the skin. This enormous fish was utterly unfit to be eaten by the Europeans; but the negroes chose out some of the nicest bits, and carefully salted them up as a most favourite provision.

It is chiefly during the winter season that our fishermen fish for the ray; but the Dutch, who are indefatigable, begin their operations earlier, and fish with better success than we do. The method practised by the fishermen of Scarborough is thought to be the best among the English; and, as Mr. Pennant has given a very succinct account of it, I will take leave to present it to the reader.

“ When they go out to fish, each person is provided with
 “ three lines: each man’s lines are fairly coiled upon a flat
 “ oblong piece of wicker work; the hooks being baited and
 “ placed very regularly in the centre of the coil. Each line is
 “ furnished with two hundred and eighty hooks, at the
 “ distance of six feet two inches from each other. The
 “ hooks are fastened to lines of twisted horse-hair, twenty-seven inches in length. The line is laid across the
 “ current, and always remains upon the ground about six
 “ hours.

“ The best bait for all kinds of fish, is fresh herring cut
 “ in pieces of a proper size. Next to herrings are the lesser
 “ lampreys, which come all winter by land-carriage from
 “ Tadcaster. The next baits in esteem are small haddocks
 “ cut in pieces, sand-worms, muscles, and limpets: and
 “ lastly, when none of these can be found, they use bullock’s liver. The hooks used there are much smaller than
 “ those employed at Iceland and Newfoundland; and are
 “ two inches and an half long in the shank. The line is
 “ made of small cording, it is always tanned before it is
 “ used, and is in length about thirteen miles.”

But this extent of line, is nothing to what the Italians throw out in the Mediterranean. Their fishing is carried on in a tartan, which is a vessel much larger than ours; and they bait a line of no less than twenty miles long, with above ten or twelve thousand hooks. This line is not regularly drawn every six hours, as with us, but remains for
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some time in the sea; and it requires the space of twenty-four hours to take it up. By this apparatus they take rays, sharks, and other fish; some of which are above a thousand pounds weight. When they have caught any of this magnitude, they strike them through with an harpoon to bring them on board, and kill them as fast as they can.

This method of catching fish is obviously fatiguing and dangerous; but the value of the capture generally repays the pain. The skate and the thornback are very good food; and their size, which is from ten pounds to two hundred weight, very well rewards the trouble of fishing for them. But it sometimes happens that the lines are visited by very unwelcome intruders; by the rough ray, the fireflare, or the torpedo.

The rough ray inflicts but slight wounds with the prickles with which its whole body is furnished. To the ignorant it seems harmless, and a man would at first sight venture to take it in his hand, without any apprehension; but he soon finds, that there is not a single part of its body that is not armed with spines; and that there is no way of seizing the animal, but by the little fin at the end of the tail.

But this animal is harmless, when compared to the fireflare, which seems to be the dread of even the boldest and most experienced fishermen. The spine, with which this animal wounds its adversaries, is not venomous, as has been vulgarly supposed, but is, in fact, a weapon of offence belonging to this animal, and capable, from its barbs, of inflicting a very terrible wound, attended with dangerous symptoms; it is fixed to the tail, as a quill is into the tail of a fowl, and is annually shed in the same manner.

THE TORPEDO is an animal of this kind, equally formidable and well known with the former; but the manner of its operating, is to this hour a mystery to mankind. The body of this fish is almost circular, and thicker than others of the ray kind; the skin is soft, smooth, and of a yellowish colour, marked, as all the kind, with large annular spots; the eyes very small; the tail tapering to a point; and the weight of the fish from a quarter to fifteen pounds. Redi found one twenty-four pounds weight. To all outward appearance, it is furnished with no extraordinary powers; it has no muscles formed for particularly great exertions; no internal conformation perceptibly differing from the rest of its kind; yet such is that unaccountable power it possesses, that, the instant it is touched, it numbs not only the hand

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and arm, but sometimes also the whole body. The shock received, by all accounts, most resembles the stroke of an electrical machine; sudden, tingling, and painful. "The instant," says Kempfer, "I touched it with my hand, I felt a terrible numbness in my arm, and as far up as the shoulder. Even if one treads upon it with the shoe on, it affects not only the leg, but the whole thigh upwards. Those who touch it with the foot, are seized with a stronger palpitation than even those who touched it with the hand. This numbness bears no resemblance to that which we feel when a nerve is a long time pressed, and the foot is said to be asleep; it rather appears like a sudden vapour, which passing through the pores in an instant, penetrates to the very springs of life, from whence it diffuses itself over the whole body, and gives real pain. The nerves are so affected, that the person struck imagines all the bones of his body, and particularly those of the limb that received the blow, are driven out of joint. All this is accompanied with an universal tremor, a sickness of the stomach, a general convulsion, and a total suspension of the faculties of the mind."

Though we are ignorant of the nature of the torpedo, yet we have some facts which relate to the manner of its acting. Reaumur, who made several trials upon this animal, has at least convinced the world that it is not necessarily, but by an effort, that the torpedo numbs the hand of him that touches it. He tried several times, and could easily tell when the fish intended the stroke, and when it was about to continue harmless. Always before the fish intended the stroke, it flattened the back, raised the head and the tail; and then, by a violent contraction in the opposite direction, struck with its back against the pressing finger; and the body, which before was flat, became humped and round.

The most probable solution of this phenomenon is, that it depends upon electricity. When the fish is dead, the whole power is destroyed, and it may be handled or eaten with perfect security. It is now known that there are more fish than this of the ray kind, possessed of the numbing quality, which has acquired them the name of the torpedo. These are described by Atkins and Moore, and are found in great abundance along the coast of Africa. They are shaped like a mackarel, except that the head is much larger; and the effects of these seem to differ in some respects. M. Condamine also speaks of a fish resembling a lamprey, endowed with similar powers.

THE LAMPREY.] There is a species of the lamprey served up as a great delicacy among the modern Romans very different from ours. Whether theirs be the murena of the ancients I will not pretend to say ; but there is nothing more certain than that our lamprey is not.

The lamprey known among us is differently estimated, according to the season in which it is caught, or the place where it has been fed. Those that leave the sea to deposit their spawn in fresh waters are the best ; those that are entirely bred in our rivers, and that have never been at sea, are considered as much inferior to the former. Those that are taken in the months of March, April, or May, just upon their leaving the sea, are reckoned very good ; those that are caught after they have cast their spawn, are found to be flabby and of little value.

The lamprey much resembles an eel in its general appearance, but is of a lighter colour, and rather a clumsier make. It differs however, in the mouth ; which is round, and placed rather obliquely below the end of the nose. It more resembles the mouth of a leech than an eel ; and the animal has a hole on the top of the head, through which it spouts water, as in the cetaceous kind. There are seven holes on each side for respiration ; and the fins are formed rather by a lengthening out of the skin, than any set of bones or spines for that purpose. As the mouth is formed resembling that of a leech, so it has a property resembling that animal, of sticking close to and sucking any body it is applied to. It is extraordinary the power they have of adhering to stones ; which they do so firmly as not to be drawn off without some difficulty. We are told of one that weighed but three pounds ; and yet it stuck so firmly to a stone of twelve pounds, that it remained suspended at its mouth, from which it was separated with no small difficulty. As to the intestines of the lamprey, it seems to have but one great bowel, running from the mouth to the vent, narrow at both ends, and wide in the middle.

So simple a conformation seems to imply an equal simplicity of appetite. In fact, the lamprey's food is either slime and water, or such small water-insects as are scarce perceivable. Perhaps its appetite may be more active at sea, of which it is properly a native ; but when it comes up into our rivers, it is hardly perceived to devour any thing.

Its usual time of leaving the sea, which it is annually seen to do in order to spawn, is about the beginning of spring ; and after a stay of a few months it returns again to the sea.

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Their preparation for spawning is peculiar; their manner is to make holes in the gravelly bottom of rivers; and on this occasion their sucking power is particularly serviceable; for if they meet with a stone of a considerable size, they will remove it and throw it out. Their young are produced from eggs in the manner of flat fish; the female remains near the place where they are excluded, and continues with them till they come forth. She is sometimes seen with her whole family playing about her; and after some time she conducts them in triumph back to the ocean.

THE STURGEON in its general form resembles a fresh-water pike. The nose is long; the mouth is situated beneath, being small, and without jaw-bones or teeth. But, though it is so harmless and ill provided for war, the body is formidable enough to appearance. It is long, pentagonal, and covered with five rows of large bony knobs, one row on the back, and two on each side, and a number of fins to give it greater expedition. Of this fish there are three kinds; the common sturgeon, the caviar sturgeon, and the huso or isinglass fish. The largest sturgeon we have heard of caught in Great-Britain was a fish taken in the Eske, where they are most frequently found, which weighed four hundred and sixty pounds. An enormous size to those who have only seen our fresh water fishes!

As the sturgeon is an harmless fish and no way voracious, it is never caught by a bait in the ordinary manner of fishing, but always in nets. From the quality of floundering at the bottom it has received its name; which comes from the German verb *floeren*, signifying to wallow in the mud. That it lives upon no large animals is obvious to all those who cut it open, where nothing is found in its stomach but a kind of slimy substance, which has induced some to think it lives only upon water and air.

The usual time for the sturgeon to come up rivers to deposit its spawn, is about the beginning of summer, when the fishermen of all great rivers make a regular preparation for its reception. At Pillau particularly the shores are formed into districts, and allotted to companies of fishermen, some of which are rented for about three hundred pounds a year. The nets in which the sturgeon is caught, are made of small cord, and placed across the mouth of the river; but in such a manner that, whether the tide ebbs or flows, the pouch of the net goes with the stream. The sturgeon thus caught, while in the water, is one of the strongest

strongest fishes that swims, and often breaks the net to pieces that encloses it; but the instant it is raised with its head above water, all its activity ceases; it is then a lifeless, spiritless lump, and suffers itself to be tamely dragged on shore.

The flesh of this animal pickled is very well known at all the tables of Europe; and is even more prized in England than in any of the countries where it is usually caught. The fishermen have two different methods of preparing it. The one is by cutting it in long pieces lengthwise, and having salted them, by hanging them up in the sun to dry: the fish thus prepared is sold in all the countries of the Levant, and supplies the want of better provision. The other method, which is usually practised in Holland, and along the shores of the Baltic, is to cut the sturgeon crosswise into short pieces, and put it into small barrels, with a pickle made of salt and saumure. This is the sturgeon which is sold in England, and of which great quantities come from the North.

A very great trade is also carried on with the roe of the Sturgeon, preserved in a particular manner, and called Caviar: it is made from the roe of all kinds of sturgeon, but particularly the second. This is much more in request in other countries of Europe than with us. To all these high relished meats, the appetite must be formed by degrees; and though formerly even in England it was very much in request at the politest tables, it is at present sunk entirely into disuse. It is still, however, a considerable merchandize among the Turks, Greeks, and Venetians. Caviar somewhat resembles soft soap in consistence; but it is of a brown, uniform colour, and is eaten as cheese with bread.

THE HUSO, OR ISINGLASS FISH furnishes a still more valuable commodity. This fish is caught in great quantities in the Danube, from the months of October to January: it is seldom under fifty pounds weight, and often above four hundred: its flesh is soft, glutinous, and flabby; but it is sometimes salted, which makes it better tasted, and then it turns red like salmon. It is for the commodity it furnishes that it is chiefly taken. The manner of making it is this: they take the skin, the entrails, the fins, and the tail of this fish, and cut them into small pieces; these are left to macerate in a sufficient quantity of warm water, and they are all boiled shortly after with a slow fire, until they are dissolved and reduced to a jelly: this jelly is spread upon instruments

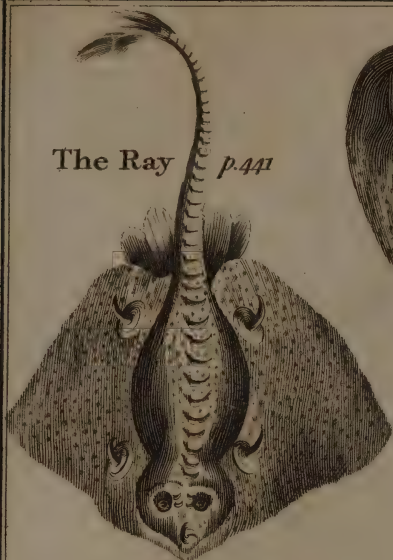
ments made for the purpose, so, that drying, it assumes the form of parchment, and, when quite dry, it is then rolled into the form which we see it in the shops. This valuable commodity is principally furnished from Russia, where they prepare great quantities surprisingly cheap.

Above all others, the cartilaginous class exhibits a variety of shapeless beings, the deviations of which from the usual form of fishes are beyond the power of words to describe, and scarcely of the pencil to draw. In this class we have the *Pipe Fish*, that almost tapers to a thread, and the *Sun Fish*, that has the appearance of a bulky head, but the body cut off in the middle; the *Hippocampus*, with an head somewhat like that of an horse, and the *Water Bat*, whose head can scarcely be distinguished from the body. In this class we find the Fishing Frog, which from its deformity some have called the *Sea Devil*, the *Chimæra*, the *Lump Fish*, the *Sea Porcupine*, and the *Sea Snail*. Of all these the history is but little known; and naturalists supply the place with description.

THE SUN FISH sometimes grows to a very large size; one taken near Plymouth was five hundred weight. In form it resembles a bream, or some deep fish cut off in the middle; the mouth is very small, and contains in each jaw two broad teeth, with sharp edges: the colour of the back is dusky and dappled, and the belly is of a silvery white. When boiled, it has been observed to turn to a glutinous jelly, and would most probably serve for all the purposes of isinglass, were it found in sufficient plenty.

THE FISHING FROG in shape very much resembles a tadpole or young frog, but of an enormous size, for it grows to above five feet long, and its mouth is sometimes a yard wide. The eyes are placed on the top of the head, and are encompassed with prickles: immediately above the nose are two long beards or filaments, small in the beginning, but thicker at the end, and round: these, as it is said, answer a very singular purpose; for being made somewhat resembling a fishing-line, it is asserted, that the animal converts them to the purposes of fishing. With these extended, the fishing frog is said to hide in muddy waters, and leave nothing but the beards to be seen; the curiosity of the smaller fish bring them to view these filaments, and their hunger induces them to seize the bait; upon which the animal in ambush instantly draws in its filaments with the little fish that had
taken

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taken the bait, and devours it without mercy. This story, though apparently improbable, has found credit among some of our best naturalists. The fishermen, have, in general, a great regard for this ugly fish, as it is an enemy to the dog fish, the bodies of those fierce and voracious animals being often found in its stomach: whenever they take it, therefore they always set it at liberty.

THE LUMP FISH is trifling in size, compared to the former: its length is but sixteen inches, and its weight about four pounds; the shape of the body is like that of a bream, deep, and it swims edgeways; the back is sharp and elevated, and the belly flat; the lips, mouth, and tongue of this animal are of a deep red; the whole skin is rough, with bony knobs, the largest row is along the ridge of the back; the belly is of a bright crimson colour; but what makes the chief singularity in this fish, is an oval aperture in the belly, surrounded with a fleshy, soft substance, that seems bearded all round; by means of this part it adheres with vast force to any thing it pleases. If flung into a pail of water, it will stick so close to the bottom, that on taking the fish by the tail, one may lift up pail and all, though it hold several gallons of water. Great numbers of these fish are found along the coasts of Greenland in the beginning of summer, where they resort to spawn. Their roe is remarkably large, and the Greenlanders boil it to a pulp for eating. They are extremely fat, but not admired in England, being both flabby and insipid.

THE SEA SNAIL takes its name from the soft and unctuous texture of its body, resembling the snail upon land. It is almost transparent, and soon dissolves, and melts away. It is but a little animal, being not above five inches long. The colour, when fresh taken, is of a pale brown, and the shape of the body is round. It is taken in England at the mouths of rivers, four or five miles distant from the sea.

The body of the PIPE FISH, in the thickest part, is not thicker than a swan-quill, while it is above sixteen inches long. Its general colour is an olive brown, marked with numbers of bluish lines, pointing from the back to the belly. It is viviparous; for, on crushing one that was just taken, hundreds of very minute young ones were observed to crawl about.

THE HIPPOCAMPUS, which from the form of its head some call the Sea Horse, never exceeds nine inches in length. It is about as thick as a man's thumb, and the body is said, while alive, to have hair on the fore part, which falls off when it is dead. The snout is a sort of a tube with a hole at the bottom, to which there is a cover, which the animal can open and shut at pleasure. Behind the eyes there are two fins, which look like ears; and above them are two holes, which serve for respiration. It, upon the whole, more resembles a great caterpillar than a fish.

From these harmless animals, covered with a slight coat of mail, we may proceed to others, more thickly defended, and more formidably armed.

In the first of this tribe we may place the SEA ORB, which is almost round, has a mouth like a frog, and is from seven inches to two feet long. Like the porcupine, whence it sometimes takes its name, being also called the Sea Porcupine, it is covered over with long thorns or prickles, which point on every side; and, when the animal is enraged, it can blow up its body as round as a bladder. Of this extraordinary creature there are many kinds: some threatening only with spines, as the SEA HEDGE HOG; others defended with a bony helmet that covers the head, as the OSTRACION, &c.

Of these scarce one is without its peculiar weapon of offence. The centriscus wounds with its spine, the ostracion poisons with its venom; the orb is impregnable, and is absolutely poisonous, if eaten.

These frightful animals are of different sizes; some not bigger than a foot-ball, and others as large as a bushel. The Americans often amuse themselves with the barren pleasure of catching these frightful creatures by a line and hook baited with a piece of sea-crab. The animal approaches the bait with its spines flattened; but when hooked and stopped by the line, straight all its spines are erected; the whole body being armed in such a manner at all points, that it is impossible to lay hold of it on any part. For this reason it is dragged to some distance from the water, and there it quickly expires. In the middle of the belly of all these there is a sort of bag or bladder filled with air, by the inflation of which the animal swells itself in the manner already mentioned.

To these animals may be added the GALLEY FISH, which Linnæus degrades into the insect tribe, under the title of the Medusa.

Medusa. To the eye of an unmindful spectator, this fish seems a transparent bubble swimming on the surface of the sea, or like a bladder variously and beautifully painted with vivid colours, where red and violet predominate, as variously opposed to the beams of the sun. It is, however, an actual fish; the body of which is composed of cartilages, and a very thin skin filled with air, which thus keeps the animal floating on the surface, as the waves and the winds happen to drive. Persons who happen to be walking along the shore often happen to tread upon these animals; and the bursting of their body yields a report as when one treads upon the swim of a fish. It has eight broad feet with which it swims, or which it expands to catch the air as with a sail. It fastens itself to whatever it meets by means of its legs, which have an adhesive quality. But what is most remarkable in this extraordinary creature, is the violent pungency of the slimy substance, with which its legs are smeared. If the smallest quantity but touch the skin, so caustic is its quality, that it burns it like hot oil dropped on the part affected. The pain is worst in the heat of the day, but ceases in the cool of the evening.

C H A P. XXXI.

Of Spinous Fishes in general.—Of Fish of Passage.—The Salmon.—Shad.—Smelt.—Flounder, &c.—The Cod.—Cod Fishing.—The Haddock.—The Whiting.—The Makarel.—The Herring.—Growth of Fishes.—The Dorado.—The Flying Fish.—The Pike.—Diseases of Fishes.—Poisonous Quality.

THE third general division of fishes is into that of the Spinous or bony kind. These are obviously distinguished from the rest by having a complete bony covering to their gills; by their being furnished with no other method of breathing but gills only; by their bones which are sharp and thorny; and their tails, which are placed in a situation perpendicular to the body.

As this order is extremely numerous, it has been divided by a French naturalist, Mr. Gouan, into two grand divisions, and these again into sub-divisions.

PRICKLY-FINNED FISHES.

PRICKLY-FINNED APODAL FISHES.

1. THE *Trichurus*. The body of a sword-form; the head oblong; the teeth sword-like, bearded near the points; the fore-teeth largest; the fin that covers the gills with seven spines; the tail ending in a point without fins; an inhabitant near the Oriental and American shores; of a silvery white; frequently leaping into the fishermen's boats in China.

2. The *Xiphias*, or *Sword-fish*. The body round; the head long; the upper jaw terminating by a long beak, in form of a sword; the fin that covers the gills with six spines; an inhabitant of Europe; an enemy to the whale.

3. The *Ophidium*, *Dorado*, or *Gilt-head*. The body sword-like; the head blunt; the fin covering the gills with seven spines; the opening of the mouth side-ways; the fins of the back, the anus, and the tail all joining together; the most beautiful of all fishes, covered over with green, gold, and silver; it is by sailors called the dolphin, and gives chase to the flying fish.

PRICKLY-FINNED JUGULAR FISHES.

4. THE *Trachinus*, or *Weever*. The body oblong; the head obtuse; the bones covering the gills jagged at the bottom; the fins covering the gills with six spines; the anus near the breast; buries itself in the sands, leaving only its nose out; and if trodden upon, immediately strikes with the spines that form its dorsal fins, which are venomous and dangerous.

5. The *Uranoscopus*. The body wedge-like; the head almost round, and larger than the body; the mouth flat; the eyes on the top of the head; the fin covering the gills with five spines; the anus in the middle of the body; an inhabitant of the Mediterranean Sea.

6. The *Callyonymus*, or *Dragonet*. The body almost wedge-like; the head broad, and larger than the body; the mouth even with the body; the bony covering of the gills close shut; the opening to the gills behind the head; the fin covering the gills with six spines; an inhabitant of the Atlantic Ocean.

7. The *Blennius*, or *Blenny*. The body oblong; the head obtusely bevil; the teeth a single range; the fin covering the gills with six spines; the ventral fins have two small blunt bones in each; a species of this animal is viviparous.

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The Ostracion

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The
Sea Orb

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The Sea Hedgehog p. 450



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PRICKLY-FINNED THORACIC FISHES.

8. The *Gobius*, or *Gudgeon*. The body round and oblong; the head with two little holes between the eyes, one before the other; the fin covering the gills with six spines; the ventral fins joined together.

9. The *Cepola*. The body sword-like; the head blunt; the mouth flat; the fin covering the gills with six spines; the fins distinct; an inhabitant of the Mediterranean Sea.

10. The *Coryphæna*, or *Razor-fish*. The body wedge-like; the head very bevil; the fin covering the gills with five spines.

11. The *Scomber*, or *Mackarel*. The body oblong; the line running down the side zigzagged towards the tail; the head sharp and small; the fins covering the gills with six spines; several false fins towards the tail.

12. The *Labrus*, or *Wrasse*. The body oval; the head middling; the lips doubled inward; both cutting and grinding teeth; the covers of the gills scaly; the fin covering the gills with five spines; the pectoral fins pointed.

13. The *Sparus*, or *Sea-bream*. The body oblong; the head middling; the lips not inverted; the teeth cutting and grinding; the cover of the gills scaly; the fin covering the gills with five rays; the pectoral fins pointed.

14. The *Chætodon*, or *Cat-fish*. The body oblong; the head small; the teeth slender and bending; the fin covering the gills with five or six spines; the fins of the back and anus scaly.

15. The *Sciæna*. The body nearly elliptical; the head bevil; the covers of the fins scaly; the fin covering the gills with six rays; the fins of the back jagged, and hidden in a furrow in the back.

16. The *Perch*. The body oblong; the head bevil; the covers of the gills scaly and toothed; the fin covering the gills with seven spines; the fins in some jagged.

17. The *Scorpena*, or *Father-lasher*. The body oblong; the head great, with beards; the covers of the gills armed with prickles; the fin covering the gills with seven spines.

18. The *Mullus*, or *Surmulet*. The body slender; the head almost four-cornered; the fin covering the gills with three spines; some of these have beards; a fish highly prized by the Romans, and still considered as a very great delicacy.

19. The *Trigla*, or the *Gurnard*. The body slender; the head nearly four-cornered, and covered with a bony coat; the fin covering the gills with seven spines; the pectoral and

ventral fins, strengthened with additional muscles and bones, and very large for the animal's size.

20. The *Cottus*, or *Bull-head*. The body wedge-like; the head flat and broader than the body; the fin covering the gills with six spines; the head furnished with prickles, knobs, and beards.

21. The *Zeus*, or *Doree*. The body oblong; the head large, bevil; the fin covering the gills with seven rays; the fins jagged; the upper jaw with a loose floating skin depending into the mouth.

22. The *Thracipterus*, or *Sabre*. The body sword-like; the head bevil; the fin covering the gills with six spines; the lateral line straight; the scales in a single order; a loose skin in both the jaws.

23. The *Gasterosteus*, or *Stickleback*. The body broadest towards the tail; the head oblong; the fin covering the gills with three spines; prickles starting backward before the back fins and the fins of the anus.

PRICKLY-FINNED ABDOMINAL FISH.

24. THE *Silurus*, or *Sheat-fish*. The body oblong; the head large; the fin covering the gills from four to fourteen spines; the leading bones or spines in the back and pectoral fins toothed.

25. The *Mugil*, or *Mullet*. The body oblong; the head almost conical; the upper jaw with a furrow, which receives the prominence of the under; the fin covering the gills with seven rays.

26. The *Polynemus*. The body oblong; the head with a beak; the fin covering the gills with from five to seven spines; the bones that move the pectoral fins not articulated to those fins.

27. The *Theutys*. The body almost elliptical; the head abruptly shortened; the fin covering the gills with five rays; the teeth in a single row, close, strong, and even.

28. The *Elops*, or *Sea-serpent*. The body slender; the head large; the fin covering the gills double with thirty spines, and armed externally with five bones resembling teeth.

SOFT-FINNED FISHES.

SOFT-FINNED APODAL FISHES.

29. THE *Muraena*, or *Eel*. The body round and slender; the head terminating in a beak; the fin covering the gills

gills with ten rays; the opening to the gills pipe-fashion, placed near the pectoral fins; the fins of the back, the anus, and the tail, united in one.

30. The *Gymnotus*, or *Carapo*. The body broadest on the back, like the blade of a knife; the head small; the fin covering the gills with five rays; the back without a fin; two beards or filaments from the upper lip; an inhabitant of Brasil.

31. The *Anarhicas*, or *Wolf-fish*. The body roundish and slender; the head large and blunt; the fore-teeth above and below conical; the grinding-teeth and those in the palate round; the fin covering the gill has six rays.

32. The *Stromateus*. The body oblong; the head small; the teeth moderately sharp; the fin covering the gills with five or six rays.

33. The *Ammodytes*, or *Launce*. The body slender and roundish; the head terminated by a beak; the teeth of a hair-like fineness: the fin covering the gills with seven rays.

SOFT-FINNED JUGULAR FISHES.

34. THE *Lepadogaster*. The body wedge-like; the head oblong, forwarder than the body, flattish, the beak resembling that of a duck; the pectoral fins double, two on each side; the ventral fins joined together; a kind of bony breast-plate between the pectoral fins; the fin covering the gills with five rays; the opening to the gills pipe-fashion.

35. The *Gadus*, or *Cod-fish*. The body oblong; the head wedge-like; the fin covering the gills with seven rays; several back and anal fins.

SOFT-FINNED THORACIC FISHES.

36. THE *Plemonectes*, or *Flumide*. The body elliptical; the head small; both eyes on one side of the head; the fin covering the gills with from four to seven rays.

37. The *Echeneis*, or *Sucking-fish*. The body almost wedge-like, moderately round; the head broader than the body; the fin covering the gills with ten rays; an oval breast-plate, streaked in form of a ladder, toothed.

38. The *Lipidopus*, or the *Garter-fish*. The body sword-like: the head lengthened out; the fins covering the gills with seven rays; three scales only on the whole body; two in the place of the ventral fins; the third from that of the anus.

SOFT-FINNED ABDOMINAL FISH.

39. The *Loricaria*. The body crufted over; the head broad, with a beak; no teeth; the fin covering the gills with fix rays.

40. The *Atherina*, or *Atherine*. The body oblong: the head of a middling fize; the lips indented; the fin covering the gills with fix rays; the line on the fides refembling a filver band.

41. The *Salmo*, or *Salmon*. The body oblong; the head a little fharp; the fin covering the gills from four to ten rays; the laft fin on the back, without its correspondent mufcles, fat.

42. The *Fiftularia*. The body angular, in form of a fpindle; the head pipe-fafhion, with a beak; the fin covering the gills with feven rays; the under jaw covering the upper.

43. The *Efox*, or *Pike*. The body round; the head with a beak; the under-jaw pierced longitudinally with fmall holes; the fin covering the gills with from feven to twelve rays.

44. The *Argentina*, or *Argentine*. The body a little round and flender; the head with a beak, broader than the body; the fin covering the gills with eight rays; a fpurious back fin.

45. The *Clupea*, or *Herring*. The body a little oblong; the head with a fmall beak; the fin covering the gills with eight rays.

46. The *Exocetas*, or *Flying-fifh*. The body oblong; the head almoft three-cornered; the fin covering the gills with ten rays; the pectoral fins placed high, and as long as the whole body; the back fin at the extremity of the back.

47. The *Cyprinus*, or *Carp*. The body elongated, almoft round; the head with a fmall beak; the hinder part of the bone covering the gills, marked with a crefcent; the fin covering the gills with three rays.

48. The *Cobitis*, or *Loach*. The body oblong; almoft equally broad throughout; the head fmall, a little elongated; the eyes in the hinder part of the head; the fin covering the gills from four to fix rays; the covers of the gills clofed below.

49. The *Amia*, or *Bonito*. The body round and flender; the head, forehead, and breaft, without fkin; the fin covering the gills with twelve rays; two beards from the nofe.

50. The

50. The *Mormyrus*. The body oblong; the head elongated; the fin covering the gills with a single ray; the opening to the gills is linear, and has no bone covering them.

Such is the system of Mr. Gouan; by reducing to which any fish that offers, we can know its rank, its affinities, and partly its anatomy; all which make a considerable part in its natural history. But, to shew the use of this system still more apparently, suppose I meet with a fish, the name to me unknown, of which I desire to know something more. The way is, first, to see whether it be a cartilaginous fish, which may be known by its wanting fins to open and shut the gills, which the cartilaginous kinds are wholly without. If I find that it has them, then it is a spinous fish; and, in order to know its kind, I examine its fins, whether they be prickly or soft: I find them soft; it is therefore to be ranked among the soft-finned fishes. I then examine its ventral, or belly-fins, and finding that the fish has them, I look for their situation, and find they lie nearer to the tail than to the pectoral fins. By this I find the animal to be a soft-finned abdominal fish. Then, to know which of the kinds of these fishes it is, I examine its figure and the shape of its head; I find the body rather oblong; the head with a small beak; the lower jaw like a saw; the fin covering the gills with eight rays. This animal must therefore be the herring, or one of that family; such as the pilchard, the sprat, the shad, or the anchovy. To give another instance: upon examining the fins of a fish to me unknown, I find them prickly; I then look for the situation of the ventral fins; I find them entirely wanting: this, then, must be a prickly-finned apodal fish. Of this kind there are but three; and, by comparing the fish with the description, I find it either of the trichurus kind, the sword-fish, or the gilt-head. Upon examining also its internal structure, I shall find a very great similitude between my fish and that placed at the head of the family.

The history of any one of this class very much resembles that of all the rest. They breathe air and water through the gills; they live by rapine, each devouring such animals as its mouth is capable of admitting; and they propagate, not by bringing forth their young alive, as in the cetaceous tribes, nor by distinct eggs, as in the generality of the cartilaginous tribes, but by spawn, or pease, as they are generally called, which they produce by hundreds of thousands.

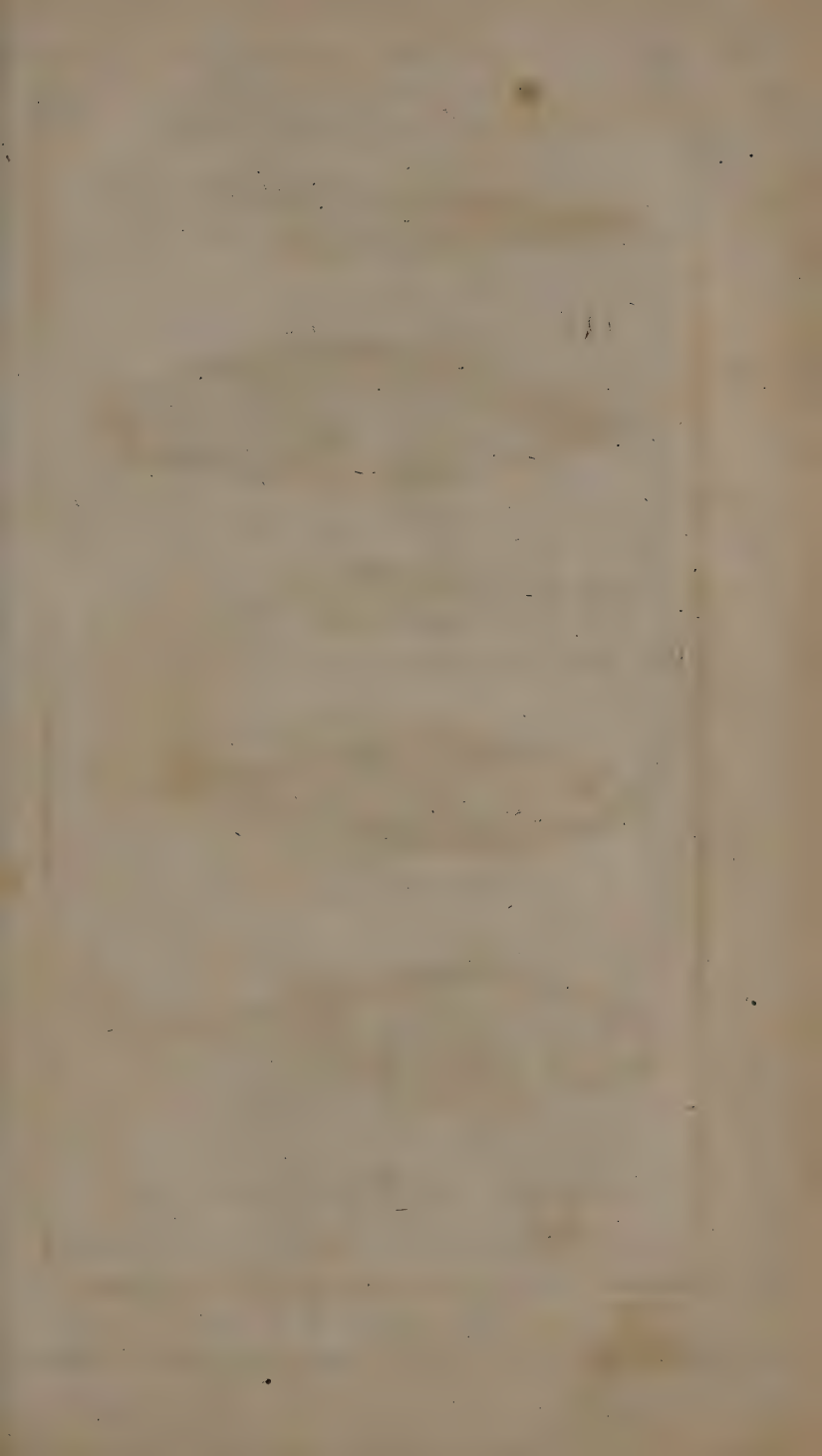
The bones of this class of fishes, when examined but slightly, appear to be entirely solid; yet, when viewed
more

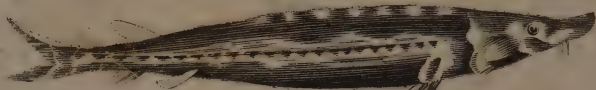
more closely, every bone will be found hollow, and filled with a substance less rancid and oily than marrow. These bones are very numerous, and pointed; and, as in quadrupeds, are the props or stays to which the muscles are fixed, which move the different parts of the body.

The number of bones in all spinous fishes of the same kind, is always the same. It is a vulgar way of speaking, to say, that fishes are at some seasons more bony than at others; but this scarce requires contradiction. It is true, indeed, that fish are at some seasons much fatter than at others; so that the quantity of the flesh being diminished, and that of the bones remaining the same, they appear to encrease in number, as they actually bear a greater proportion.

As the spinous fish partake less of the quadruped in their formation than any others, so they can bear to live out of their own element a shorter time. Some, indeed, are more vivacious in air than others; the eel will live several hours out of water; and the carp has been known to be fattened in a damp cellar. The method is, by placing it in a net well wrapped up in wet moss, the mouth only out, and then hung up in a vault. The fish is fed with white bread and milk, and the net now and then plunged into the water.

It is impossible to account for the different operations of the same element upon animals, that, to appearance, have the same conformation. To some fishes, bred in the sea, fresh water is immediate destruction: on the other hand, some fishes, that live in our lakes and ponds, cannot bear the salt water. This circumstance may possibly arise from the superior weight of the sea water. As, from the great quantity of salt dissolved in its composition, it is much heavier than fresh water, so it is probable it lies with greater force upon the organs of respiration, and gives them their proper and necessary play: on the other hand, those fish which are used only to fresh water, cannot bear the weight of the saline fluid, and expire in a manner suffocated in the grossness of the strange element. There are some tribes, however, that spend a part of their season in one, and a part in the other. Thus the *salmon*, the *shad*, the *smelt*, and the *flounder*, annually quit their native ocean, and come up our rivers to deposit their spawn. This seems the most important business of their lives; and there is no danger which they will not encounter, even to the surmounting precipices, to find a proper place for the deposition of their future offspring. The salmon, upon these occasions,





The Sturgeon p. 446



The Salmon p. 456



The Saw Fish a Species of the Sword Fish. p. 432



The Cod p. 459



The Tunny a Species of the Scomber. p. 453

occasions, is seen to ascend rivers five hundred miles from the sea, and to brave, not only the danger of various enemies, but also to spring up cataracts as high as a house. As soon as they come to the bottom of the torrent, they seem disappointed to meet the obstruction, and swim some paces back : they then take a view of the danger that lies before them, survey it motionless for some minutes, advance, and again retreat ; till at last summoning up all their force, they take a leap from the bottom, their body straight, and strongly in motion ; and thus most frequently clear every obstruction. It sometimes, happens, however, that they want strength to make the leap ; and then, in our fisheries, they are taken in their descent.

But the length of the voyage performed by these fishes, is sport, if compared to what is annually undertaken by some tribes that constantly reside in the ocean. Of this kind are the cod, the haddock, the whiting, the mackarel, the tunny, the herring, and the pilchard,

THE COD seems to be the foremost of this wandering tribe ; and is only found in our northern part of the world. This animal's chief place of resort is on the banks of Newfoundland, and the other sand banks that lie off Cape-Breton. That extensive flat seems to be no other than the broad top of a sea mountain, extending for above five hundred miles long, and surrounded with a deeper sea. Hither the cod annually repair in numbers beyond the power of calculation, to feed on the quantity of worms that are to be found there in the sandy bottom. Here they are taken in such quantities, that they supply all Europe with a considerable share of provision. The English have stages erected all along the shore for salting and drying them ; and the fishermen, who take them with the hook and line, which is their method, draw them in as fast as they can throw out. This immense capture, however, makes but a very small diminution, when compared to their numbers ; and when their provision there is exhausted, or the season for propagation returns, they go off to the polar seas, where they deposit.

THE HADDOCK, the WHITING, and the MACKAREL, are thought, by some, to be driven upon our coasts rather by their fears than their appetites ; and it is to the pursuit of the larger fishes, we owe their welcome visits. It is much more probable, that they come for that food which is found in more plenty near the shore, than farther out at sea. The limits of a shoal are precisely known ; for if the fishermen put down their lines at the distance of more than three miles

limits

from shore, they catch nothing but dog-fish: a proof that the haddock is not there.

But of all migrating fish, the HERRING and the PILCHARD take the most adventurous voyages. HERRINGS are found in the greatest abundance in the highest northern latitudes. In those inaccessible seas, that are covered with ice for a great part of the year, the herring and pilchard find a quiet and sure retreat from all their numerous enemies: thither neither man, nor their still more destructive enemy, the fin-fish, or the cachalot, dares to pursue them. The quantity of insect food which those seas supply, is very great; whence, in that remote situation, defended by the icy rigour of the climate, they live at ease, and multiply beyond expression. From this most desirable retreat, Anderson supposes they would never depart, but that their numbers render it necessary for them to migrate; and, as bees from a hive, they are compelled to seek for other retreats.

For this reason, the great colony is seen to set out from the icy sea about the middle of winter; composed of such numbers, that if all the men in the world were to be loaded with herrings, they would not carry the thousandth part away. But they no sooner leave their retreats, but millions of enemies appear to thin their squadrons. The fin-fish and the cachalot swallow barrels at a yawn; the porpoises, the grampus, the shark, and the whole numerous tribe of dog-fish, find them an easy prey, and desist from making war upon each other: but still more, the unnumbered flocks of sea-fowl that chiefly inhabit near the pole, watch the outset of their dangerous migration, and spread extensive ruin.

In this exigence, the defenceless emigrants find no other safety but by crowding closer together, and leaving to the outmost bands the danger of being the first devoured; thus, like sheep when frightened, that always run together in a body, and each finding some protection in being but one of many that are equally liable to invasion, they are seen to separate into shoals, one body of which moves to the west, and pours down along the coasts of America, as far south as Carolina, and but seldom farther. In Chesapeake Bay, the annual inundation of these fish is so great, that they cover the shores in such quantities as to become a nuisance. Those that hold more to the east, and come down towards Europe, endeavour to save themselves from their merciless pursuers, by approaching the first shore they can find; and that which first offers in their descent, is the coast of Iceland, in the beginning of March. Upon their arrival on that coast,

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their phalanx, which has already suffered considerable diminutions, is nevertheless of amazing extent, depth, and closeness, covering an extent of shore as large as the island itself. The whole water seems alive; and is seen so black with them to a great distance, that the number seems inexhaustible.

That body which comes upon our coasts, begins to appear off the Shetland Isles in April. These are the forerunners of the grand shoal which descends in June; while its arrival is easily announced, by the number of its greedy attendants, the gannet, the gull, the shark, and the porpoises. When the main body is arrived, its breadth and depth is such as to alter the very appearance of the ocean. It is divided into distinct columns, of five or six miles in length, and three or four broad; while the water before them curls up, as if forced out of its bed. Sometimes they sink for the space of ten or fifteen minutes, then rise again to the surface; and, in bright weather, reflect a variety of splendid colours, like a field bespangled with purple, gold and azure. The fishermen are ready prepared to give them a proper reception; and, by nets made for the occasion, they take sometimes above two thousand barrels at a single draught.

The power of encreasing in these animals, exceeds our idea, as it would, in a very short time, outstrip all calculation: and a single herring, if suffered to multiply unmolested and undiminished for twenty years, would shew a progeny greater in bulk than ten such globes as that we live upon. Although the usual way with spinous fishes is to produce by spawn; yet there are some, such as the eel and the blenny, that are known to bring forth their young alive.

With respect to the growth of fishes, it is observed, that among carps, particularly the first year, they grow to about the size of the leaf of a willow-tree; at two years, they are about four inches long. They grow but one inch more the third season, which is five inches. Those of four years old are about six inches; and seven after the fifth. From that to eight years old they are found to be large in proportion to the goodness of the pond, from eight to twelve inches. With regard to sea-fish, the fishermen assure us that a fish must be six years old before it is fit to be served up to table. They instance it in the growth of a mackarel. They assure us that those of a year old are as large as one's finger; that those of two years, are about twice that length; at three and four years, they are that small kind of mackarel that have neither milts nor rows; and between five and six, they are those full grown fish that are served up to our tables. In the same manner, with regard to flat fishes,

fishes, they tell us that the turbot and barble at one year are about the size of a crown piece; the second year as large as the palm of one's hand; and at the fifth and sixth year, they are large enough to be served up to table. Thus it appears that fish are a considerable time in coming to their full growth, and that they are a long time destroyed before it comes to their turn to be destroyers *.

All fish live upon each other, in some state of their existence. Those with the largest mouths, attack and devour the larger kinds; those whose mouths are less, lie in wait for the smaller fry; and even these chiefly subsist upon spawn. Of those which live in the ocean of the spinous kinds, the DORADO is the most voracious. This is chiefly found in the tropical climates; and is at once the most active, and the most beautiful of the finny race. It is about six feet long; the back all over enamelled with spots of a blueish green and silver; the tail and fins of a gold colour; and all have a brilliancy of tint, that nothing but Nature's pencil can attain to: the eyes are placed on each side of the head, large and beautiful, surrounded with circles of shining gold. In the seas where they are found, these fish are always in motion, and play round ships in full sail, with ease and security: for ever either pursuing or pursued, they are seen continually in a state of warfare; either defending themselves against the shark, or darting after the smaller fishes. Above all others, the FLYING-FISH most abounds in these seas; and as it is a small animal, seldom growing above the size of a herring, it is chiefly sought by the dorado. Nature has furnished each respectively with the powers of pursuit and evasion. The dorado being above six feet long, yet not thicker than a salmon, and furnished with a full complement of fins, cuts its way through the water with amazing rapidity: on the other hand, the flying-fish is furnished with two pair of fins longer than the body, and these also moved by a stronger set of muscles than any other. This equality of power seems to furnish one of the most entertaining spectacles those seas can exhibit. The efforts to seize on the one side, and the arts of escaping on the other, are perfectly amusing. The dorado is seen, upon this occasion, darting after its prey, which will not leave the water, while it has the advantage of swimming, in the beginning of the chase. But, like an hunted hare, being tired at last, it then has recourse

* *Traité des Pêches, par Monsieur Duhamel. Sect. 3. p. 100.*

to another expedient for safety, by flight. The long fins, which began to grow useless in the water, are now exerted in a different manner and different direction to that in which they were employed in swimming: by this means the timid little animal rises from the water, and flutters over its surface, for two or three hundred yards, till the muscles employed in moving the wings, are enfeebled by that particular manner of exertion. By this time, however, they have acquired a fresh power of renewing their efforts in the water, and the animal is capable of proceeding with some velocity by swimming: still, however, the active enemy keeps it in view, and drives it again from the deep; till, at length the poor little creature is seen to dart to shorter distances, to flutter with greater effort, and to drop down at last into the mouth of its fierce pursuer. But not the dorado alone, all animated nature seems combined against this little fish, which seems possessed of double powers, only to be subject to greater dangers. For though it should escape from its enemies of the deep, yet the tropic bird and the albatross are for ever upon the wing to seize it. Thus pursued in either element, it sometimes seeks refuge from a new enemy; and it is not unfrequent for whole shoals of them to fall on ship-board, where they furnish man with an object of useless curiosity.

The greediness with which sea-fish devour the bait is prodigious, if compared with the manner they take it in fresh water. The lines of such fishermen as go off to sea, are coarse, thick, and clumsy compared to what are used by those who fish at land. Their baits are seldom more than a piece of a fish, or the flesh of some quadruped, stuck on the hook in a bungling manner; and scarce any art is employed to conceal the deception. But it is otherwise in fresh water; the lines must often be drawn to an hair-like fineness; they must be tinged of the peculiar colour of the stream; the bait must be formed with the nicest art, and even, if possible, to exceed the perfection of nature: yet still the fishes approach it with diffidence, and often swim round it with disdain. The cod, on the banks of Newfoundland, the instant the hook, which is only baited with the guts of the animal last taken, is dropped into the water, darts to it at once, and the fishermen have but to pull up as fast as they throw down. But it is otherwise with those who fish in fresh waters, they must wait whole hours in fruitless expectation; and *the patience of a fisherman* is proverbial among us.

This comparative neglect of food, which is found in all the tribes of fresh water fishes, renders them less turbulent and
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less destructive among each other. Of all these the PIKE is the most active and voracious; and our poets, whose business it is to observe the surface of nature, have called it the tyrant of the watery plain. The pike will attack every fish less than itself; and it is sometimes seen choaked, by attempting to swallow such as are too large a morsel. It is immaterial of what species the animal it pursues appears to be, whether of another or its own; all are indiscriminately devoured; so that every fish owes its safety to its minuteness, its celerity, or its courage: nor does the pike confine itself to feed on fish and frogs; it will draw down the water-rat and the young ducks, as they are swimming about. Gesner tells us of a mule that stooped to drink in the water, when a famished pike, that was near, seized it by the nose, nor was it disengaged till the beast flung it on shore. So great is their rapacity, that they will contend with the otter for his prey, and even endeavour to force it from him.

As fish are enemies one to another, so each species is infested with worms of different kinds, peculiar to itself. The great fish abound with them; and the little ones are not entirely free. These troublesome vermin lodge themselves either in the jaws, and the intestines internally, or near the fins without. When fish are healthy and fat, they are not much annoyed by them; but in winter, when they are lean or sickly, they then suffer very much.

Nor does the reputed longevity of this class secure them from their peculiar disorders. They are not only affected by too much cold, but there are frequently certain dispositions of the element in which they reside, unfavourable to their health and propagation. Some ponds they will not breed in, however artfully disposed for supplying them with fresh recruits of water, as well as provision. In some seasons also they are found to feel epidemic disorders, and are seen dead by the water-side, without any apparent cause.

The fact of some fishes in the warm climates being poisonous when eaten, cannot be doubted. We have a paper in the Philosophical Transactions, giving an account of the poisonous qualities of those found at New Providence, one of the Bahama islands. The author there assures us, that the greatest part of the fish of that dreary coast, are all of a deadly nature: their smallest effects being to bring on a terrible pain in the joints, which, if terminating favourably, leaves the patient without any appetite for several days after. It is not those of the most deformed figure, or the most frightful to look at, that are alone to be dreaded; all kinds,

kinds, at different times, are alike dangerous; and the same species which has this day served for nourishment, is the next, if tried, found to be fatal!

Happy England! where the sea furnishes an abundant and luxurious repast, and the fresh waters an innocent and harmless pastime; where the angler, in chearful solitude, strolls by the edge of the stream, and fears neither the coiled snake, nor the lurking crocodile; where he can retire at night, with his few trouts, to borrow the charming description of old Walton, to some friendly cottage, where the landlady is good, and the daughter innocent and beautiful; where the room is cleanly, with lavender in the sheets, and twenty ballads stuck about the wall! There he can enjoy the company of a talkative brother sportsman, have his trouts dressed for supper, tell tales, sing old tunes, or make a catch! There he can talk of the wonders of nature with learned admiration, or find some harmless sport to content him, and pass away a little time, without offence to God, or injury to man!

C H A P. XXXII.

Of Shell-fish in general.—The Crustaceous Class.—The Lobster.—The Crab.—The Land-crab.—The Soldier-crab.—The Tortoise.—The Land-tortoise.—The Turtle.—Of Testaceous-fishes.—Of the turbinated or Snail kind.—The Garden-snail.—The Fresh-water-snail.—The Sea-snail.—The Nautilus.—Of Bivalved-fish.—The Muscle.—The Oyster.—The Cockle.—The Scollop.—The Razor-fish.—Of Pearls and the Fishery.—Of Multivalve Shell-fish.—The Sea-urchin.—The Pholades.

TH E R E are two classes of animals, inhabiting the water, which commonly receive the name of fishes, entirely different from those we have been describing, and also very distinct from each other. These are divided by naturalists into Crustaceous and Testaceous animals: both, totally unlike fishes to appearance, seem to invert the order of nature; and as those have their bones on the inside, and their muscles hung upon them for the purposes of life and motion, these, on the contrary, have all their bony parts on the outside, and all their muscles within. Not to talk mysteriously—all who have seen a lobster or an oyster, perceive that the shell in these bears a strong analogy to the bones of other animals;

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and, that, by these shells, the animal is sustained and defended.

- Crustaceous fish, such as the crab and the lobster, have a shell not quite of a stony hardness, but rather resembling a firm crust, and in some measure capable of yielding. Testaceous fishes, such as the oyster or cockle, are furnished with a shell of a stony hardness; very brittle, and incapable of yielding. Of the crustaceous kinds are the lobster, the crab, and the tortoise: of the testaceous, that numerous tribe of oysters, muscles, cockles, and sea-snails, which offer with infinite variety.

THE LOBSTER KIND.] However different in figure the lobster and the crab may seem, their manners and conformation are nearly the same. With all the voracious appetites of fishes, they are condemned to lead an insect life at the bottom of the water; and though pressed by continual hunger, they are often obliged to wait till accident brings them their prey. Though without any warmth in their bodies, or even without red blood circulating through their veins, they are animals wonderfully voracious. Whatever they seize upon that has life, is sure to perish, though ever so well defended: they even devour each other: and, to encrease our surprize still more, they may, in some measure, be said to eat themselves; as they change their shell and their stomach every year, and their old stomach is general y the first morsel that serves to glut the new.

The LOBSTER is an animal of so extraordinary a form, that those who first see it are apt to mistake the head for the tail; but it is soon discovered that the animal moves with its claws foremost; and that the part which plays within itself by joints, like a coat of armour, is the tail. The mouth, like that of insects, opens the long way of the body, not cross-ways, as with man, and the higher race of animals. It is furnished with two teeth for the comminution of its food; but as these are not sufficient, it has three more in the stomach; one on each side, and the other below. Between the two teeth there is a fleshy substance, in the shape of a tongue. The intestines consist of one long bowel, which reaches from the mouth to the vent; but what this animal differs in from all others, is, that the spinal marrow is in the breast bone. It is furnished with two long feelers or horns, that issue on each side of the head, that seem to correct the dimness of its sight, and apprise the animal of its danger, or of its prey. The tail, or that jointed instrument at the other end, is the grand instrument of motion; and with this it can raise itself in the water.

water. Under this we usually see lodged the spawn in great abundance; every pea adhering to the next by a very fine filament, which is scarcely perceivable. Every lobster is an hermaphrodite, and is supposed to be self-impregnated. The ovary, or place where the spawn is first produced, is backwards, toward the tail, where a red substance is always found, and which is nothing but a cluster of peas, that are yet too small for exclusion. From this receptacle there go two canals, that open on each side at the jointures of the shell, at the belly; and through these passages the peas descend to be excluded, and placed under the tail, where the animal preserves them from danger for some time, until they come to maturity; when, being furnished with limbs and motion, they drop off into the water.

When the young lobsters leave the parent, they immediately seek for refuge in the smallest clefts of rocks, and in such-like crevices at the bottom of the sea, where the entrance is but small, and the opening can be easily defended. There, without seeming to take any food, they grow larger in a few weeks time, from the mere accidental substances which the water washes to their retreats. By this time also they acquire an hard, firm shell, which furnishes them with both offensive and defensive armour. They then begin to issue from their fortresses, and boldly creep along the bottom, in hopes of meeting with more diminutive plunder. The spawn of fish, the smaller animals of their own kind, but chiefly the worms that keep at the bottom of the sea, supply them with plenty. They keep in this manner close among the rocks, busily employed in scratching up the sand with their claws for worms, or surprising such heedless animals as fall within their grasp: thus they have little to apprehend, except from each other; for in them, as among fishes, the large are the most formidable of all enemies to the small.

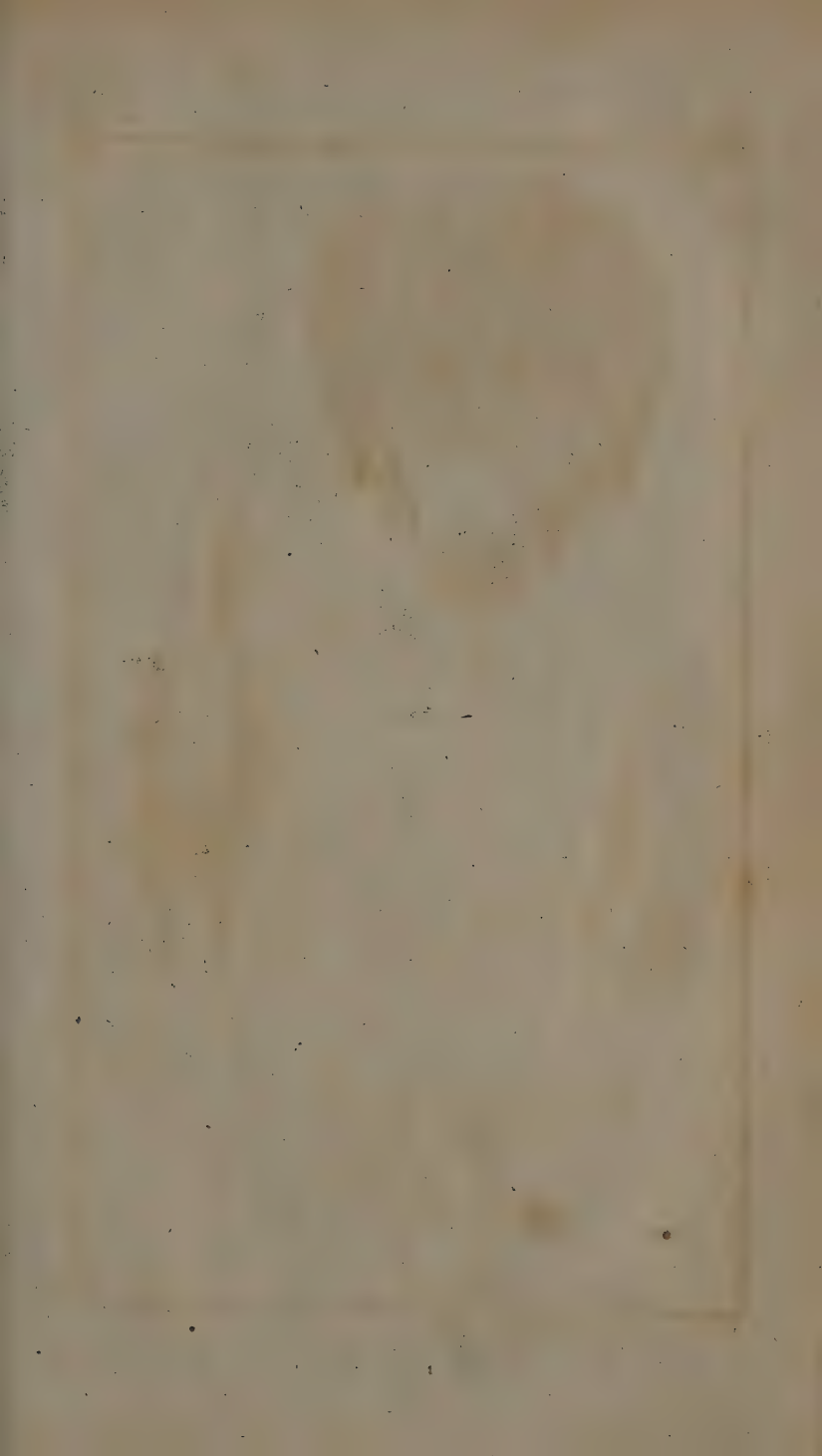
But this life of abundance and security is soon to have a most dangerous interruption; for the body of the lobster still continuing to encrease, while its shell remains unalterably the same, the animal becomes too large for its habitation, and imprisoned within the crust that has naturally gathered round it, there comes on a necessity of getting free. The young of this kind, therefore, that grow faster, as I am assured by the fishermen, change their shell oftener than the old, who come to their full growth, and who remain in the same shell often for two years together. In general, however, all these animals change their shell once

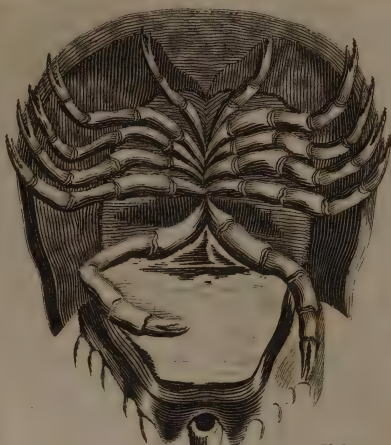
a year; and this is not only a most painful operation, but also subjects them to every danger. Just before casting its shell, it throws itself upon its back, strikes its claws against each other, and every limb seems to tremble; its feelers are agitated, and the whole body is in violent motion: it then swells itself in an unusual manner, and at last the shell is seen beginning to divide at its junctures. It also seems turned inside out; and its stomach comes away with its shell. After this, by the same operation, it disengages itself of the claws, which burst at the joints; the animal, with a tremulous motion, casting them off as a man would kick off a boot that was too big for him.

Thus, in a short time, this wonderful creature finds itself at liberty; but in so weak and enfeebled a state, that it continues for several hours motionless. Indeed, so violent and painful is the operation, that many of them die under it; and those which survive, are in such a weakly state for some time, that they neither take food, nor venture from their retreats. Immediately after this change, they have not only the softness, but the timidity of a worm. Every animal of the deep is then a powerful enemy, which they can neither escape nor oppose; and this, in fact, is the time when the dog-fish, the cod, and the ray, devour them by hundreds. But this state of defenceless imbecility continues for a very short time: the animal, in less than two days, is seen to have the skin that covered its body grown almost as hard as before; its appetite is seen to increase; and, strange to behold! the first object that tempts its gluttony, is its own stomach, which it so lately was disengaged from. This it devours with great eagerness; and some time after eats even its former shell. In about forty eight hours, in proportion to the animal's health and strength, the new shell is perfectly formed, and as hard as that which was but just thrown aside.

When the lobster is completely equipped in its new shell, it then appears how much it has grown in the space of a very few days; the dimensions of the old shell being compared with those of the new, it will be found that the creature is increased above a third in its size; and, like a boy that has outgrown his clothes, it seems wonderful how the deserted shell was able to contain so great an animal as entirely fills up the new.

The creature thus furnished, not only with a complete covering, but also a greater share of strength and courage, ventures more boldly among the animals at bottom; and





The
Violet Crab
p. 469



The
Lobster Crab
p. 469

The
Sea Lobster
p. 466



The River Crab
p. 469



not a week passes that in its combats it does not suffer some mutilation. A joint, or even a whole claw, is sometimes snapped off in these encounters. At certain seasons of the year these animals never meet each other without an engagement. In these, to come off with the loss of a leg, or even a claw, is considered as no great calamity; the victor carries off the spoil to feast upon at his leisure, while the other retires from the defeat to wait for a thorough repair. This repair is not long in procuring. From the place where the joint of the claw was cut away, is seen in a most surprising manner to burgeon out the beginning of a new claw. This, if observed, at first, is small and tender, but grows, in the space of three weeks, to be almost as large and as powerful as the old one. I say almost as large, for it never arrives to the full size; and this is the reason we generally find the claws of the lobsters of unequal magnitude.

Of this extraordinary yet well-known animal there are many varieties, with some differences in the claws, but little in the habits or conformation. It is found above three feet long; and if we may admit the shrimp and the prawn into the class, though unfurnished with claws, it is seen not above an inch. These all live in the water, and can bear its absence for but a few hours. The shell is black when taken out of the water, but turns red by boiling. The most common way of taking the lobster is in a basket, or pot, as the fishermen call it, made of wicker-work, in which they put the bait, and then throw it to the bottom of the sea, in six or ten fathom water. The lobsters creep into this for the sake of the bait, but are not able to get out again. The river craw-fish differs little from the lobster, but that the one will live only in fresh water, and the other will thrive only in the sea.

As the CRAB is found upon land as well as in the water, the peculiarity of its situation produces a difference in its habitudes, which it is proper to describe. The LAND-CRAB is found in some of the warmer regions of Europe, and in great abundance in all the tropical climates in Africa and America. They are of various kinds, and endued with various properties; some being healthful, delicious, and nourishing food; others, poisonous or malignant to the last degree; some are not above half an inch broad, others are found a foot over; some are of a dirty brown, and others beautifully mottled. That animal called the violet crab of the Caribbee Islands, is the most noted, both for its shape, the delicacy of its flesh, and the singularity of its manners.

The violet crab somewhat resembles two hands cut through the middle and joined together; for each side looks like four fingers, and the two nippers or claws resemble the thumbs. All the rest of the body is covered with a shell as large as a man's hand and bunched in the middle, on the fore-part of which there are two long eyes of the size of a grain of barley, as transparent as crystal and as hard as horn. A little below these is the mouth, covered with a sort of barbs, under which there are two broad sharp teeth as white as snow. They are not placed, as in other animals, cross-ways, but in the opposite direction, not much unlike the blades of a pair of scissars. With these teeth they can easily cut leaves, fruits, and rotten wood, which is their usual food. But their principal instrument for cutting and seizing their food is their nippers, which catch such an hold, that the animal loses the limb sooner than its grasp, and is often seen scampering off, having left its claw still holding fast upon the enemy. The faithful claw seems to perform its duty, and keeps for above a minute fastened upon the finger while the crab is making off *. In fact it loses no great matter by leaving a leg or an arm, for they soon grow again, and the animal is found as perfect as before.

This, however, is the least surprising part of this creature's history: and what I am going to relate, were it not as well known and as confidently confirmed as any other circumstance in natural history, might well stagger our belief. These animals live not only in a kind of society in their retreats in the mountains, but regularly once a year march down to the sea-side in a body of some millions at a time. As they multiply in great numbers, they chuse the months of April or May to begin their expedition; and then fallly out by thousands from the stumps of hollow trees, from the clefts of rocks, and from the holes which they dig for themselves under the surface of the earth. At that time the whole ground is covered with this band of adventurers; there is no setting down one's foot without treading upon them. The sea is their place of destination, and to that they direct their march with right-lined precision. No geometrician could send them to their destined station by a shorter course; they neither turn to the right or left, whatever obstacles intervene; and even if they meet with a house, they will attempt to scale the walls to keep the unbroken tenor of their way. But though this be the general order

* Brown's Jamaica, p. 423.

of their route, they upon other occasions are compelled to conform to the face of the country; and if it be intersected by rivers, they are then seen to wind along the course of the stream. The procession sets forward from the mountains with the regularity of an army under the guidance of an experienced commander. They are commonly divided into three battalions; of which, the first consists of the strongest and boldest males, that like pioneers, march forward to clear the route and face the greatest dangers. These are often obliged to halt for want of rain, and go into the most convenient encampment till the weather changes. The main body of the army is composed of females, which never leave the mountains till the rain is set in for some time, and then descend in regular battalia, being formed into columns of fifty paces broad, and three miles deep, and so close that they almost cover the ground. Three or four days after this the rear-guard follows; a straggling undisciplined tribe, consisting of males and females, but neither so robust nor so numerous as the former. The night is their chief time of proceeding; but if it rains by day, they do not fail to profit by the occasion; and they continue to move forward in their slow uniform manner. When the sun shines and is hot upon the surface of the ground, they then make an universal halt, and wait till the cool of the evening. When they are terrified, they march back in a confused disorderly manner, holding up their nippers, with which they sometimes tear off a piece of the skin, and then leave the weapon where they inflicted the wound. They even try to intimidate their enemies; for they often clatter their nippers together, as if it were to threaten those that come to disturb them. But though they thus strive to be formidable to man, they are much more so to each other; for they are possessed of one most unsocial property, which is, that if any of them by accident is maimed in such a manner as to be incapable of proceeding, the rest fall upon and devour it on the spot, and then pursue their journey.

When after a fatiguing march, and escaping a thousand dangers, for they are sometimes three months in getting to the shore, they have arrived at their destined port, they prepare to cast their spawn. The peas are as yet within their bodies, and not excluded, as is usual in animals of this kind, under the tail; for the creature waits for the benefit of the sea-water to help the delivery. For this purpose, the crab has no sooner reached the shore, than it eagerly goes to the edge of the water, and lets the waves

wash over its body two or three times. This seems only a preparation for bringing their spawn to maturity; for without farther delay they withdraw to seek a lodging upon land: in the mean time, the spawn grows larger, is excluded out of the body, and sticks to the barbs under the flap, or more properly the tail. This bunch is seen as big as an hen's egg, and exactly resembling the roes of herrings. In this state of pregnancy, they once more seek the shore for the last time, and shaking off their spawn into the water, leave accident to bring it to maturity. At this time whole shoals of hungry fish are at the shore, and about two thirds of the crabs eggs are immediately devoured by these rapacious invaders. The eggs that escape are hatched under the sand; and soon after millions at a time of these little crabs are seen quitting the shore, and slowly travelling up to the mountains.

The old ones, however, are not so active to return; they have become so feeble and lean, that they can hardly creep along, and the flesh at that time changes its colour. Most of them, therefore, are obliged to continue in the flat parts of the country till they recover, making holes in the earth, which they cover at the mouth with leaves and dirt so that no air may enter. There they throw off their old shells, which they leave as it were quite whole, the place where they opened on the belly being unseen. At that time they are quite naked, and almost without motion for six days together, when they become so fat as to be delicious food. They have then under their stomachs four large white stones, which gradually decrease in proportion as the shell hardens, and when they come to perfection are not to be found. It is at that time that the animal is seen slowly making its way back; and all this is most commonly performed in the space of six weeks.

The descent of these creatures for such important purposes deserves our admiration; but there is an animal of the lobster kind that annually descends from its mountains in like manner, and for purposes still more important and various. Its descent is not only to produce an offspring, but to provide itself a covering; not only to secure a family, but to furnish an house. The animal I mean is the *soldier-crab*, which has some similitude to the lobster, if divested of its shell. It is usually about four inches long, has no shell behind, but is covered down to the tail with a rough skin, terminating in a point. It is however armed with strong hard nippers before, like the lobster; and one
of

of them is as thick as a man's thumb, and pinches most powerfully. It is, as I said, without a shell to any part except its nippers; but what Nature has denied this animal it takes care to supply by art; and taking possession of the deserted shell of some other animal, it resides in it, till, by growing too large for its habitation, it is under a necessity of change. It is a native of the West-India Islands; and like the former, it is seen every year descending from the mountains to the sea-shore, to deposit its spawn, and to provide itself with a new shell. This is a most bustling time with it, having so many things to do; and, in fact, very busy it appears. It is very probable that its first care is to provide for its offspring before it attends to its own wants; and it is thought, from the number of little shells which it is seen examining, that it deposits its spawn in them, which thus is placed in perfect security till the time of exclusion.

Yet it is not only till after many trials, but many combats also, that the soldier is completely equipped; for there is often a contest between two of them for some well looking favourite shell for which they are rivals. They both endeavour to take possession; they strike with their claws; they bite each other, till the weakest is obliged to yield, by giving up the object of dispute. It is then that the victor immediately takes possession, and parades in his new conquest three or four times back and forward upon the strand before his envious antagonist.

When this animal is taken, it sends forth a feeble cry, endeavouring to seize the enemy with its nippers; which if it fastens upon it will sooner die than quit the grasp. The wound is very painful, and not easily cured. For this reason, and as it is not much esteemed for its flesh, it is generally permitted to return to its old retreat to the mountains in safety. There it continues till the necessity of changing once more, and the desire of producing an offspring, expose it to fresh dangers the year ensuing.

TORTOISES are usually divided into those that live upon land, and those that subsist in the water; and use has made a distinction even in the name; the one being called tortoises, the other turtles. However, Seba has proved that all tortoises are amphibious; that the land tortoise will live in the water; and that the sea turtle can be fed upon land. A land tortoise was brought to him that was caught in one of the canals of Amsterdam, which he kept for half
a year

a year in his house, where it lived very well contented in both elements. When in the water it remained with its head above the surface; when placed in the sun, it seemed delighted with its beams, and continued immoveable while it felt their warmth. The difference, therefore, in these animals, arises rather from their habits than their conformation; and, upon examination, there will be less variety found between them than between birds that live upon land, and those that swim upon the water.

All tortoises, in their external form, much resemble each other; their outward covering being composed of two great shells, the one laid upon the other, and only touching at the edges: however, when we come to look closer, we shall find that the upper shell is composed of no less than thirteen pieces. There are two holes at either edge of this vaulted body; one for a very small head, shoulders and arms, to peep through, the other at the opposite edge, for the feet and the tail. These shells the animal is never disengaged from; and they serve for its defence against every creature but man.

The land tortoise is generally found, from one to five feet long, from the end of the snout to the end of the tail; and from five inches to a foot and an half across the back. It has a small head, somewhat resembling that of a serpent: an eye without the upper lid; the under eye-lid serving to cover and keep that organ in safety. It has a strong, scaly tail, like the lizard. Its head the animal can put out and hide at pleasure, under the great penthouse of its shell: there it can remain secure from all attacks. As the tortoise lives wholly upon vegetable food, it never seeks the encounter; yet, if any of the smaller animals attempt to invade its repose, they are sure to suffer. The tortoise, impregnably defended, is furnished with such a strength of jaw, that, though armed only with bony plates instead of teeth, wherever it fastens, it infallibly keeps its hold, until it has taken out the piece.

Though peaceable in itself, it is formed for war in another respect, for it seems almost endued with immortality. Nothing can kill it; the depriving it of one of its members, is but a slight injury; it will live, though deprived of the brain; it will live, though deprived of its head. Tortoises are commonly known to exceed eighty years old; and there was one kept in the Archbishop of Canterbury's garden at Lambeth, that was remembered above an hundred and twenty. It was at last killed by the severity of the

the frost, from which it had not sufficiently defended itself in its winter retreat, which was a heap of sand, at the bottom of the garden.

Though there is a circulation of blood in the tortoise, yet as the lungs are left out of the circulation, the animal is capable of continuing to live without continuing to breathe. In this it resembles the bat, the serpent, the mole, and the lizard; like them it takes up its dark residence for the winter; and, at that time, when its food is no longer in plenty, it happily becomes insensible to the want. But it must not be supposed that, while it is thus at rest, it totally discontinues to breathe; on the contrary, an animal of this kind, if put into a close vessel, without air, will soon be stifled; though not so readily as in a state of vigour and activity.

The eggs of all the tortoise kind, like those of birds, are furnished with a yolk and a white; but the shell is different, being somewhat like those soft eggs that hens exclude before their time: however, this shell is much thicker and stronger, and is a longer time in coming to maturity in the womb. The land tortoise lays but a few in number, if compared to the sea turtle, who deposits from an hundred and fifty to two hundred in a season.

The amount of the land tortoise's eggs I have not been able to learn; but, from the scarceness of the animal, I am apt to think they cannot be very numerous. When it prepares to lay, the female scratches a slight depression in the earth, generally in a warm situation, where the beams of the sun have their full effect. There depositing her eggs, and covering them with grass and leaves, she forsakes them, to be hatched by the heat of the season. The young tortoises are generally excluded in about twenty-six days; but, as the heat of the weather assists, or its coldness retards incubation, sometimes it happens that there is a difference of two or three days. The little animals no sooner leave the egg, than they seek for their provision, entirely self-taught; and their shell, with which they are covered from the beginning, expands and grows larger with age. As it is composed of a variety of pieces, they are all capable of extension at their sutures; and the shell admits of increase in every direction.

It is common enough to take these animals into gardens, as they are thought to destroy insects and snails in great abundance. We are even told, that, in hot countries, they
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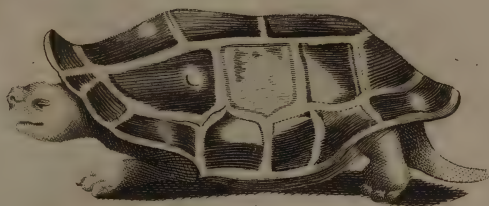
are admitted into a domestic state, as they are great destroyers of bugs.

The *Sea Tortoise*, or *Turtle*, as it is now called, is generally found larger than the former.

The Great Mediterranean Turtle is the largest of the turtle kind with which we are acquainted. It is found from five to eight feet long, and from six to nine hundred pounds weight; but, unluckily, its utility bears no proportion to its size, as it is unfit for food, and sometimes poisons those who eat it. The shell also, which is a tough, strong integument, resembling an hide, is unfit for all serviceable purposes. One of these animals was taken in the year 1729, at the mouth of the Loire, in nets that were not designed for so large a capture. This turtle, which was of enormous strength, by its own struggles, involved itself in the nets, in such a manner, as to be incapable of doing mischief: yet, even thus shackled, it appeared terrible to the fishermen, who were at first for flying; but, finding it impotent, they gathered courage to drag it on shore, where it made a most horrible bellowing; and when they began to knock it on the head with their gaffs, it was to be heard at half a mile's distance. They were still further intimidated by its nauseous and pestilential breath, which so powerfully affected them, that they were near fainting. This animal wanted but four inches of being eight feet long, and was above two feet over; its shell more resembled leather than the shell of a tortoise; and, unlike all other animals of this kind, it was furnished with teeth in each jaw, one rank behind another, like those of a shark; its feet also, different from the rest of this kind, wanted claws; and the tail was quite disengaged from the shell, and fifteen inches long, more resembling that of a quadruped than a tortoise.

These are a formidable and useless kind, if compared to the turtle caught in the South Seas and the Indian Ocean. These are of different kinds; not only unlike each other in form, but furnishing man with very different advantages. They are usually distinguished by sailors into four kinds; the Trunk Turtle, the Loggerhead, the Hawksbill, and the Green Turtle.

The Hawksbill Turtle is the least of the four, and has a long and small mouth, somewhat resembling the bill of an hawk. The flesh of this also is very indifferent eating; but the shell serves for the most valuable purposes. This is



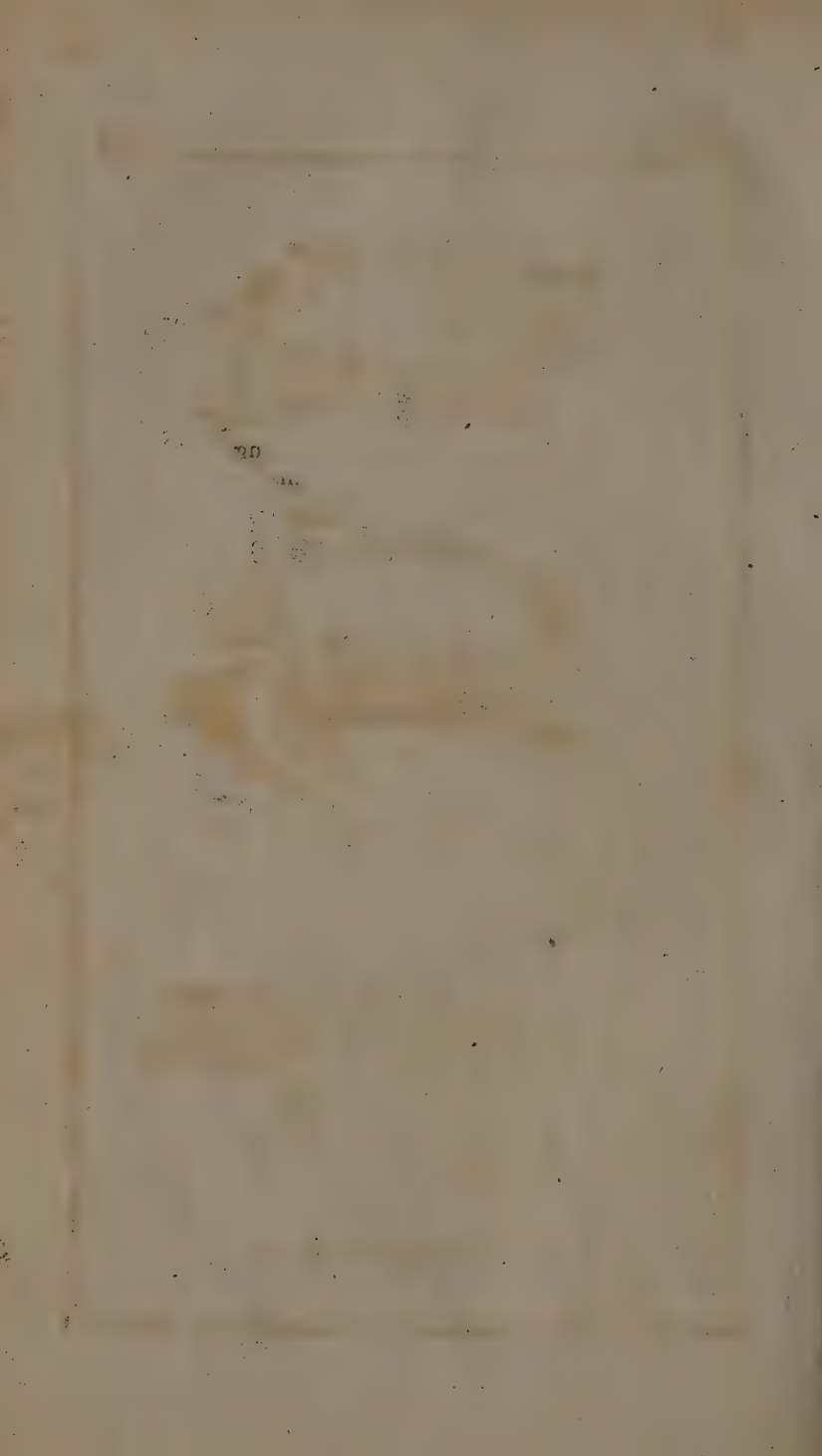
The Land Tortoise p. 476



The Sea Tortoise or Turtle p. 474



The Flying Fish p. 456



the animal that supplies the tortoise-shell, of which such a variety of beautiful trinkets are made.

But of all animals of the tortoise kind, the green turtle is the most noted, and the most valuable, from the delicacy of its flesh, and its nutritive qualities, together with the property of being easily digested. It is generally found about two hundred weight; though some are five hundred, and others not above fifty.

This animal seldom comes from the sea but to deposit its eggs, and now and then to sport in fresh-water. Its chief food is a submarine plant, that covers the bottom of several parts of the sea not far from the shore. There the turtles are seen, when the weather is fair, feeding in great numbers, like flocks of sheep, several fathoms deep upon the verdant carpet below. When done feeding, they generally float with their heads above water, unless they are alarmed by the approach of hunters, or birds of prey; in which case, they suddenly plunge to the bottom.

When the time for laying approaches, the female is seen, towards the setting of the sun, drawing near the shore, and looking earnestly about her, as if afraid of being discovered. When she perceives any person on shore, she seeks for another place; but if otherwise, she lands when it is dark, and goes to take a survey of the sand where she designs to lay. Having marked the spot, she goes back without laying, for that night, to the ocean again; but the next night returns to deposit a part of her burthen. She begins by working and digging in the sand with her fore feet, till she has made a round hole, a foot broad, and a foot and a half deep, just at the place a little above where the water reaches highest. This done, she lays eighty or ninety eggs at a time, each as big as a hen's egg, and as round as a ball. She continues laying about the space of an hour; during which time, if a cart were driven over her, she would not be induced to stir. The eggs are covered with a tough, white skin, like wetted parchment. When she has done laying, she covers the hole so dexterously, that it is no easy matter to find the place. When the turtle has done laying, she returns to the sea, and leaves her eggs to be hatched by the heat of the sun. At the end of fifteen days, she lays about the same number of eggs again; and at the end of another fifteen days, she repeats the same; three times in all, using the same precautions every time for their safety.

In about twenty-four or twenty-five days after laying, the eggs are hatched by the heat of the sun; and the young turtles,

turtles, being about as big as quails, are seen bursting from the sand, as if earth-born, and running directly to the sea, with instinct only for their guide; but, to their great misfortune, it often happens that, their strength being small, the surges of the sea, for some few days, beat them back upon the shore. Thus exposed, they remain a prey to thousands of birds that then haunt the coasts; and these stooping down upon them, carry off the greatest part, and sometimes the whole brood, before they have strength sufficient to withstand the waves, or dive to the bottom. There are several ways contrived for taking these animals. One is, to seize them when coupled together, at the breeding season, when they are very easily approached, and as easily seen.

Another way of taking them is by the harpoon, either when they are playing on the surface of the water, or feeding on the bottom; when the harpoon is skilfully darted, it sticks fast in the shell of the back; the wood then disengages from the iron, and the line is long enough for the animal to take its range; for if the harpooner should attempt at once to draw the animal into his boat till it is weakened by its own struggling, it would probably get free.

There is yet another way which, though seemingly awkward, is said to be attended with very great success. A good diver places himself at the head of the boat; and when the turtles are observed, which they sometimes are in great numbers, asleep on the surface, he immediately quits the vessel at about fifty yards distance, and keeping still under water, directs his passage to where the turtle was seen, and coming up beneath, seizes it by the tail; the animal awaking, struggles to get free; and by this both are kept at the surface until the boat arrives to take them in.

The shell of TESTACEOUS FISHES may be considered as an habitation supplied by nature. It is an hard stony substance, made up somewhat in the manner of a wall. Part of the stony substance the animal derives from outward objects, and the fluids of the animal itself furnish the cement. These united make that firm covering which shell-fish generally reside in till they die.

But, in order to give a more exact idea of the manner in which sea-shells are formed, we must have recourse to an animal that lives upon land, with the formation of whose shell we are best acquainted. This is the garden-snail, that carries its box upon its back.

To begin with the animal in its earliest state, and trace the progress of its shell from the time it first appears—The instant the young snail leaves the egg, it carries its shell or its box on its back. It does not leave the egg till it is arrived at a certain growth, when its little habitation is sufficiently hardened. This beginning of the shell is not much bigger than a pin's head, but grows in a very rapid manner, having at first but two circumvolutions, for the rest are added as the snail grows larger. In proportion as the animal encreases in size, the circumvolutions of the shell encrease also, until the number of those volutes come to be five, which is never exceeded.

The part where the animal enlarges its shell is at the mouth, to which it adds in proportion as it finds itself stunted in its habitation below. Being about to enlarge its shell, it is seen with its little teeth biting and clearing away the scaly skin that grows at the edges. It is sometimes seen to eat those bits it thus takes off; at other times it only cleans away the margin when covered with films, and then adds another rim to its shell.

For the purposes of making the shell, which is natural to the animal, and without which it could not live three days, its whole body is furnished with glands, from the orifices of which flows out a kind of slimy fluid, like small spiders threads, which join together in one common crust or surface, and in time condense and acquire a stony hardness. It is this slimy humour that grows into a membrane and afterwards a stony skin; nor can it have escaped any who have observed the track of a snail, that glistening substance which it leaves on the floor or the wall is no other than the materials with which the animal adds to its shell, or repairs it when broken.

With respect to the figure of shells, Aristotle has divided them into three kinds; and his method is, above all others, the most conformable to nature. These are, first, the univalve, or turbinated, which consist of one piece, like the box of a snail; secondly, the bivalve, consisting of two pieces, united by a hinge, like an oyster; and thirdly, the multivalve, consisting of more than two pieces, as the acorn-shell, which has not less than twelve pieces that go to its composition. All these kinds are found in the sea at different depths; and are valuable in proportion to their scarceness or beauty. All shells are formed of an animal or calcareous earth, that ferments with vinegar and other acids,

acids, and that burns into lime, and will not easily melt into glass.

Every shell, wherever it is found, is the spoil of some animal, that once found shelter therein. It matters not by what unaccountable means they may have wandered from the sea; but they exhibit all, and the most certain marks of their origin. From their numbers and situation, we are led to conjecture, that the sea reached the places where they are found; and from their varieties we learn how little we know of all the sea contains at present; as the earth furnishes many kinds which our most exact and industrious shell-collectors have not been able to fish up from the deep.

To conceive the manner in which those animals subsist that are hid from us at the bottom of the deep, we must again have recourse to one of a similar nature and formation, that we know, viz. the GARDEN-SNAIL. It is furnished with the organs of life in a manner almost as complete as the largest animal; with a tongue, brain, salivary ducts, glands, nerves, stomach, and intestines; liver, heart and blood-vessels: besides this, it has a purple bag that furnishes a red matter to different parts of the body together with strong muscles that hold it to the shell, and which are hardened, like tendons, at their insertion.

But these it possesses in common with other animals. We must now see what it has peculiar to itself. The first striking peculiarity is, that the animal has got its eyes on the points of its largest horns. When the snail is in motion, four horns are distinctly seen; but the two uppermost and longest deserve peculiar consideration, both on account of the various motions with which they are endued, as well as their having their eyes fixed at the extreme ends of them. The eyes the animal can direct to different objects at pleasure, by a regular motion out of the body; and sometimes it hides them, by a very swift contraction into the belly. Under the small horns is the animal's mouth; and though it may appear too soft a substance to be furnished with teeth, yet it has not less than eight of them, with which it devours leaves, and other substances, seemingly harder than itself; and with which it sometimes bites off pieces of its own shell.

At the expiration of eighteen days after coition, the snails produce their eggs, and hide them in the earth with the greatest solicitude and industry. These eggs are in great numbers,

numbers, round, white, and covered with a soft shell: they are also stuck to each other by an imperceptible slime, like a bunch of grapes, of about the size of a small pea.

The snail is possessed not only of a power of retreating into its shell, but of mending it when broken. Sometimes these animals are crushed seemingly to pieces; and to all appearance utterly destroyed; yet still they set themselves to work, and, in a few days, mend all their numerous breaches. The same substance by which the shell is originally made, goes to the re-establishment of the ruined habitation.

As the snail is furnished with all the organs of life and sensation, it is not wonderful to see it very voracious. It chiefly subsists upon the leaves of plants and trees; but is very delicate in its choice. At the approach of winter, it buries itself in the earth, or retires to some hole, to continue in a torpid state, during the severity of the season. It is sometimes seen alone; but more frequently in company in its retreat; several being usually found together, apparently deprived of life and sensation. For the purposes of continuing in greater warmth and security, the snail forms a cover or lid to the mouth of its shell with its slime, which stops it up entirely, and thus protects it from every external danger. When the cover is formed too thick, the snail then breaks a little hole in it, which corrects the effect of that closeness, which proceeded from too much caution. In this manner, sheltered in its hole from the weather, defended in its shell by a cover, it sleeps during the winter; and, for six or seven months, continues without food or motion, until the genial call of spring breaks its slumber, and excites its activity.

The snail, having slept for so long a season, awakes one of the first fine days of April; breaks open its cell, and sallies forth to seek for nourishment. At first, it is not very difficult in the choice of its food; almost any vegetable that is green, seems welcome; but the succulent plants of the garden are chiefly grateful; and the various kinds of pulse are, at some seasons, almost wholly destroyed by their numbers. A wet season is generally favourable to their production; for this animal cannot bear very dry seasons, or dry places, as they cause too great a consumption of its slime, without plenty of which it cannot subsist in health and vigour.

Such are the most striking particulars in the history of this animal; and this may serve as a general picture, to

which the manners, and habitudes of the other tribes of this class may be compared and referred. These are, the sea snail, of which naturalists have, from the apparent difference of their shells, mentioned fifteen kinds*; the fresh water snail, of which there are eight kinds; and the land-snail, of which there are five: and these all bear a strong resemblance to the garden snail. All **SNAILS THAT LIVE IN WATER**, are peculiarly furnished with a contrivance by Nature, for rising to the surface, or sinking to the bottom. The manner in which this is performed, is by opening and shutting an orifice on the right side of the neck, which is furnished with muscles for that purpose. The snail sometimes gathers this aperture into an oblong tube, and stretches or protends it above the surface of the water, in order to draw in or expel the air, as it finds occasion. This may not only be seen, but heard also by the noise which the snail makes in moving the water. By dilating this it rises; by compressing it, the animal sinks to the bottom.

But what renders these animals far more worthy of notice is, that they are viviparous, and bring forth their young not only alive, but with their shells upon their backs. This seems surprising; yet it is incontestably true: the young come to some degree of perfection in the womb of the parent; there they receive their stony coat; and from thence are excluded, with a complete apparatus for subsistence.

This striking difference between the fresh-water and the garden snail, obtains also in some of the **SEA KIND**; among which there are some that are found viviparous, while others lay eggs in the usual manner. But this is not the only difference between land and sea snails. Many of the latter entirely want horns; and none of them have above two. Indeed, if the horns of snails be furnished with eyes, and if, as some are willing to think, the length of the horn, like the tube of a telescope, assists vision, these animals, that chiefly reside in the gloomy bottom of the deep, can have no great occasion for them. Eyes would be unnecessary to creatures whose food is usually concealed in the darkest places; and who, possessed of very little motion, are obliged to grope for what they subsist on. To such, I say, eyes would rather be an obstruction than an advantage; and perhaps even those that live upon land are without them!

* D'Argenville's Conchyliologie.

There is a difference also in the position of the mouth, in the garden and the water snail. In the former, the mouth is placed cross-wise, as in quadrupeds; furnished with jaw-bones, lips and teeth. In most of the sea-snails, the mouth is placed longitudinally in the head; and, in some, obliquely, or on one side. Others, of the trochus kind, have no mouth whatsoever; but are furnished with a trunk, very long in some kinds, and shorter in others.

Of all sea snails, that which is most frequently seen swimming upon the surface, and whose shell is the thinnest and most easily pierced, is the NAUTILUS. Whether, upon these occasions, it is employed in escaping its numerous enemies at the bottom, or seeking for food at the surface, I will not venture to decide. It seems most probable, that the former is the cause of its frequently appearing; for, upon opening the stomach, it is found to contain chiefly that food which it finds at the bottom.

Although there are several species of the nautilus, yet they all may be divided into two: the one with a white shell, as thin as paper, which it often is seen to quit, and again to resume; the other with a thicker shell, sometimes of a beautiful mother-of-pearl colour, and that quits its shell but rarely. This shell outwardly resembles that of a large snail, but is generally six or eight inches across: within, it is divided into forty partitions, that communicate with each other by doors, if I may so call them, through which one could not thrust a goose-quill: almost the whole internal part of the shell is filled by the animal, the body of which, like its habitation, is divided into as many parts as there are chambers in its shell: all the parts of its body communicate with each other, through the doors or openings, by a long blood vessel, which runs from the head to the tail: thus the body of the animal, if taken out of the shell, may be likened to a number of soft bits of flesh, of which there are forty, threaded upon a string. From this extraordinary conformation, one would not be apt to suppose that the nautilus sometimes quitted its shell, and returned to it again; yet nothing, though seemingly impossible, is more certain. The manner by which it contrives to disengage every part of its body from so intricate an habitation; by which it makes a substance, to appearance as thick as one's wrist, pass through forty doors, each of which would scarcely admit a goose quill, is not yet discovered: but the fact is certain; for the animal is often found without its shell; and the shell more frequently destitute of the animal. It is most probable, that it has a

power of making the substance of one section of its body remove up into that which is next; and thus, by multiplied removals, it gets free.

But this, though very strange, is not the peculiarity for which the nautilus has been the most distinguished. Its spreading the thin oar, and catching the flying gale, to use the poet's description of it, has chiefly excited human curiosity. These animals, particularly those of the white, light kind, are chiefly found in the Mediterranean; and scarce any who have sailed on that sea, but must have often seen them. When the sea is calm, they are observed floating on the surface; some spreading their little sail; some rowing with their feet, as if for life and death; and others still, floating upon their mouths, like a ship with the keel upward. If taken while thus employed, and examined, the extraordinary mechanism of their limbs for sailing will appear more manifest. The nautilus is furnished with eight feet, which issue near the mouth, and may as properly be called barbs: these are connected to each other by a thin skin, like that between the toes of a duck, but much thinner and more transparent. Of these eight feet thus connected, six are short, and these are held up as sails to catch the wind in sailing: the two others are longer, and are kept in the water; serving, like paddles, to steer their course by. When the weather is quite calm, and the animal is pursued from below, it is then seen expanding only a part of its sail, and rowing with the rest: whenever it is interrupted, or fears danger from above, it instantly furls the sail, catches in all its oars, turns its shell mouth downward, and instantly sinks to the bottom. Sometimes also it is seen pumping the water from its leaking hulk; and, when unfit for sailing deserts its shell entirely. The forsaken hulk is seen floating along, till it dashes, by a kind of shipwreck, upon the rocks or the shore.

It may seem whimsical to make a distinction between the animal perfections of turbinated and BIVALVED SHELL-FISH, or to grant a degree of superiority to the snail above the oyster. Yet this distinction strongly and apparently obtains in nature; and we shall find the bivalved tribe of animals in every respect inferior to those we have been describing.

THE MUSCLE, as is well known, whether belonging to fresh or salt-water, consists of two equal shells, joined at the back by a strong muscular ligament that answers all the purposes of an hinge. By the elastic contraction of these, the

the animal can open its shells at pleasure, about a quarter of an inch from each other. The fish is fixed to either shell by four tendons, by means of which it shuts them close, and keeps its body firm from being crushed by any shock against the walls of its own habitation. It is furnished, like all other animals of this kind, with vital organs, though these are situated in a very extraordinary manner. It has a mouth furnished with two fleshy lips; its intestine begins at the bottom of the mouth, passes through the brain, and makes a number of circumvolutions through the liver; on leaving this organ, it goes on straight into the heart, which it penetrates, and ends in the anus; near which the lungs are placed, and through which it breathes, like those of the snail kind; and in this manner its languid circulation is carried on*.

The multitude of these animals in some places is very great; but from their defenceless state, the number of their destroyers are in equal proportion.

But notwithstanding the number of this creature's animated enemies, it seems still more fearful of the agitations of the element in which it resides; for if dashed against rocks, or thrown far on the beach, it is destroyed without a power of redress. In order to guard against these, which are to this animal the commonest and the most fatal accidents, although it has a power of slow motion, which I shall presently describe, yet it endeavours to become stationary, and to attach itself to any fixed object it happens to be near. For this purpose it is furnished with a very singular capacity of binding itself by a number of threads to whatever object it approaches; and these Reaumur supposed it spun artificially, as spiders their webs which they fasten against a wall. Of this, however, later philosophers have found very great reason to doubt. It is therefore supposed that these threads, which are usually called the beard of the muscle, are the natural growth of the animal's body, and by no means produced at pleasure.

Its instrument of motion, by which it contrives to reach the object it wants to bind itself to, is that muscular substance resembling a tongue, which is found long in proportion to the size of the muscle. In some it is two inches long, in others not a third part of these dimensions. This the animal has a power of thrusting out of its shell; and with this it is capable of making a slight furrow in the sand at the bottom. By means of this furrow it can erect itself

* M. Mery. Anat. des Moules d'Etang.

upon the edge of its shell ; and thus continuing to make the furrow in proportion as it goes forward, it reaches out its tongue, that answers the purpose of an arm, and thus carries its shell edge-ways, as in a groove, until it reach the point intended. There where it determines to take up its residence it fixes the ends of its beard, which are glutinous, to the rock or the object, whatever it be ; and thus, like a ship at anchor, braves all the agitations of the water. I have seen the beards a foot and an half long ; and of this substance the natives of Palermo sometimes make gloves and stockings.

These shell-fish are found in lakes, rivers, and in the sea. Those of the lake often grow to a very large size ; but they seem a solitary animal, and are found generally separate from each other. Those of rivers are not so large, but yet in greater abundance ; but the sea muscle is the most plenty. These are often bred artificially in salt-water marshes that are overflowed by the tide ; the fishermen throwing them in at the proper seasons ; and there being undisturbed by the agitations of the sea, and not preyed upon by their powerful enemies at the bottom, they cast their eggs, which soon become perfect animals, and these are generally found in clusters of several dozen together. It requires a year for the peopling a muscle-bed ; so that, if the number consists of forty thousand, a tenth part may annually be left for the peopling the bed anew. Muscles are taken from their beds from the month of July to October ; and they are sold at a very moderate price.

From this animal the OYSTER differs very little, except in the thickness of its shell, and its greater imbecility. The oyster, like the muscle, is formed with organs of life and respiration, with intestines which are very voluminous, a liver, lungs, and heart. Like the muscle, it is self-impregnated ; and the shell, which the animal soon acquires, serves it for its future habitation. Like the muscle, it opens its shell to receive the influx of water, and like that animal, is strongly attached to its shells both above and below.

The oyster differs from the muscle in being utterly unable to change its situation. It is entirely without that tongue which we saw answering the purposes of an arm in the other animal ; but nevertheless is often attached very firmly to any object it happens to approach. Nothing is so common in the rivers of the tropical climates as to see

oysters growing even amidst the branches of the forest. Many trees which grow along the banks of the stream often bend their branches into the water, and particularly the mangrove, which chiefly delights in a moist situation. To these the oysters hang in clusters, like apples upon the most fertile tree; and in proportion as the weight of the fish sinks the plant into the water, where it still continues growing, the number of oysters encrease, and hang upon the branches. This is effected by means of a glue proper to themselves, which, when it cements, the joining is as hard as the shell, and is as difficultly broken.

Oysters usually cast their spawn in May, which at first appears like drops of candle-grease, and sticks to any hard substance it falls upon. These are covered with a shell in two or three days; and in three years the animal is large enough to be brought to market. As they invariably remain in the places where they are laid, and as they grow without any other seeming food than the afflux of sea-water, it is the custom at Colchester, and other parts of the kingdom, where the tide settles in marshes on land, to pick up great quantities of small oysters along the shore, which when first gathered seldom exceed the size of a sixpence. These are deposited in beds where the tide comes in, and in two or three years grow to a tolerable size. They are said to be better tasted for being thus sheltered from the agitations of the deep; and a mixture of fresh water entering into these repositories, is said to improve their flavour, and to encrease their growth and fatness.

The oysters, however, which are prepared in this manner, are by no means so large as those found sticking to rocks at the bottom of the sea, usually called rock-oysters. These are sometimes found as broad as a plate, and are admired by some as excellent food. But what is the size of these compared to the oysters of the East Indies, some of whose shells I have seen two feet over! The oysters found along the coast of Coromandel are capable of furnishing a plentiful meal to eight or ten men; but it seems universally agreed that they are no way comparable to ours for delicacy or flavour.

Thus the muscle and the oyster appear to have but few distinctions, except in their shape, and the power of motion in the former. Other bivalved shell-fish, such as the COCKLE, the SCALLOP, and the RAZOR-shell, have differences equally minute. The power of changing place, which some of them effect in a manner quite peculiar to themselves,

makes their greatest difference. The *scallop* is particularly remarkable for its method of moving forward upon land, or swimming upon the surface of the water. When this animal finds itself deserted by the tide, it makes very remarkable efforts to regain the water, moving towards the sea in a most singular manner. It first gapes with its shell as widely as it can, the edges being often an inch asunder; then it shuts them with a jerk, and by this the whole animal rises five or six inches from the ground. It thus tumbles any how forward, and then renews the operation until it has attained its journey's end. When in the water it is capable of supporting itself upon the surface; and there opening and shutting its shells, it tumbles over and over, and makes its way with some celerity.

THE PIVOT, or RAZOR-SHELL, has a very different kind of motion. As the former moves laboriously and slowly forward, so the razor-shell has only a power of sinking point downward. The shells of this animal resemble nothing so much as the haft of a razor; and by this form it is better enabled to dive into the soft sand at the bottom. All the motions of this little animal are confined to sinking or rising a foot downwards or upwards in the sand, for it never leaves the spot where first it was planted. From time to time it is seen to rise about half way out of its hole; but if any way disturbed, it sinks perpendicularly down again. Just over the place where the razor buries itself, there is a small hole like a chimney, through which the animal breathes, or imbibes the sea-water. Upon the desertion of the tide, these holes are easily distinguished by the fishermen who seek for it; and their method of enticing the razor up from the depth of its retreat, is by sprinkling a little sea-salt upon the hole. This melting, no sooner reaches the razor below, than it rises instantly straight upwards, and shews about half its length above the surface. This appearance, however, is instantaneous; and if the fisher does not seize the opportunity, the razor buries itself with great ease to its former depth. There it continues secure; no salt can allure it a second time; but it remains unmolested, unless the fisher will be at the trouble of digging it out sometimes two feet below the surface.

Such are the minute differences between bivalved shell-fish; but in the great out-lines of their nature, they exactly resemble each other. It is particularly in this class of shell-fish that pearls are found in greatest abundance. The pearl
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seems bred from no disorder in the animal, but accidentally produced by the same matter that goes to form the shell. This substance, which is soft at first, quickly hardens; and thus, by successive coats, layer over layer, the pearl acquires its dimensions. If cut through, it will be found to consist of several coats, like an onion; and sometimes a small speck is seen in the middle, upon which the coats were originally formed.

All oysters, and most shell-fish, are found to contain pearls; but that which particularly obtains the name of the pearl oyster, has a large strong whitish shell, wrinkled and rough without, and within smooth, and of a silver colour. From these the mother-of-pearl is taken, which is nothing more than the internal coats of the shell, resembling the pearl in colour and consistence. There are a great number of pearl fisheries in America and Asia. The chief of these is carried on in the Persian Gulph.

The wretched people that are destined to fish for pearls, are either Negroes, or some of the poorest of the natives of Persia. The divers are not only subject to the dangers of the deep, to tempests, to suffocation at the bottom, to being devoured by sharks, but from their profession universally labour under a spitting of blood, occasioned by the pressure of air upon their lungs in going down to the bottom. The most robust and healthy young men are chosen for this employment, but they seldom survive it above five or six years. Their fibres become rigid; their eye-balls turn red; and they usually die consumptive.

It is amazing how very long they are seen to continue at the bottom. Some, as we are assured, have been known to continue three quarters of an hour under water without breathing; and to one unused to diving, ten minutes would suffocate the strongest. They fish for pearls, or rather the oysters that contain them, in boats twenty-eight feet long; and of these there are sometimes three or four hundred at a time, with each seven or eight stones, which serve for anchors. There are from five to eight divers belonging to each, that dive one after another. They are quite naked, except that they have a net hanging down from the neck to put their oysters in, and gloves on their hands to defend them while they pick the oysters from the holes in the rocks; for in this manner alone can they be gathered. Every diver is sunk by means of a stone, weighing fifty pounds, tied to the rope by which he descends. He places his foot in a kind
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of stirrup, and laying hold of the rope with his left-hand, with his right he stops his nose to keep in his breath, as upon going down he takes in a very long inspiration. They are no sooner come to the bottom, but they give the signal to those who are in the boat to draw up the stone; which done, they go to work, filling their net as fast as they can; and then giving another signal, the boats above pull up the net loaded with oysters, and shortly after the diver himself, to take a new inspiration. They dive to the depth of fifteen fathoms, and seldom go deeper. They generally go every morning by break of day to this fatiguing employment, taking the land-wind to waft them out to sea, and returning with the sea breeze at night. The owners of the boats usually hire the divers, and the rest of the boats crew, as we do our labourers, at so much a day. All the oysters are brought on shore, where they are laid in a great heap till the pearl fishery is over, which continues during the months of November and December. When opportunity serves, they then examine every oyster, and it is accidental whether the capture turns out advantageous. Indeed, no human being can wish well to a commerce, which thus chains such a number of fellow-creatures to the bottom, to pluck up a glittering mouldering pebble.

MULTIVALVE SHELL-FISH may be considered as animals shut up in round boxes. Of these there are principally two kinds; such as move, and such as are stationary: the first are usually known in our cabinets by the name of sea-eggs; the others are as often admired, from the cavities which they scoop out for their habitation in the hardest marble. The first are called, by naturalists, Echini, or Urchins: the latter are called Pholades, or File Fish.

To a slight view, the SEA-URCHIN may be compared to the husk of a chesnut; being like it round, and with a number of bony prickles standing out on every side. The mouth is placed downwards; the vent is above; the shell is a hollow vase, resembling a scooped apple; and this filled with a soft, muscular substance, through which the intestines wind from the bottom to the top. The mouth, which is placed undermost, is large and red, furnished with five sharp teeth, which are easily discerned. The jaws are strengthened by five small bones, in the centre of which is a small fleshy tongue; and from this the intestines make a winding of five
spires,

spires, round the internal sides of the shell, ending at top, where the excrements are excluded. But what makes the most extraordinary part of this animal's conformation, are its horns and its spines, that point from every part of the body, like the horns of a snail, and that serve at once as legs to move upon, as arms to feel with, and as instruments of capture and defence. Between these horns it has also spines that are not endued with such a share of motion. The spines and the horns issue from every part of its body; the spines being hard and prickly; the horns being soft, longer than the spines, and never seen except in the water. They are put forward and withdrawn like the horns of a snail, and are hid at the basis of the spines, serving, as was said before, for procuring food and motion. All this apparatus, however, is only seen when the animal is hunting its prey at the bottom of the water; for a few minutes after it is taken, all the horns are withdrawn into the body, and most of the spines drop off.

It is generally said of insects, that those which have the greatest number of legs, always move the slowest: but this animal seems to be an exception to the rule; for though furnished with two thousand spines, and twelve hundred horns, all serving for legs, and from their number seeming to impede each other's motion, yet it runs with some share of swiftness at the bottom, and it is sometimes no easy matter to overtake it. It is often taken upon the ebb, by following it in shallow water, either in an ozier basket, or simply with the hand. Both the spines and the horns assist its motion; and the animal is usually seen running with the mouth downward.

Some kinds of this animal are as good eating as the lobster; and its eggs, which are of a deep red, are considered as a very great delicacy. But of others the taste is but indifferent; and in all places, except the Mediterranean, they are little sought for, except as objects of curiosity.

Very different in motion, though not much different in shape from these, are the ACORN Shell-fish, the THUMB-FOOTED Shell-fish, and the IMAGINARY BARNACLE. These are fixed to one spot, and appear to vegetate from a stalk. Indeed, to an inattentive spectator, each actually seems to be a kind of fungus that grows in the deep, destitute of animal life as well as motion. But the enquirer will soon change his opinion, when he comes to observe this mushroom-like figure more minutely. He will then see that the animal residing within the shell has not only life, but some degree of voraciousness.

voraciousness. They are seen adhering to every substance that is to be met with in the ocean; rocks, roots of trees, ships bottoms, whales, lobsters, and even crabs; like bunches of grapes, clung to each other. It is amusing enough to behold their operations *. They for some time remain motionless within their shell; but when the sea is calm, they are seen opening the lid, and peeping about them. They then thrust out their long neck, look round them for some time, and then abruptly retreat back into their box, shut their lid, and lurk in darkness and security. Some people eat them; but they are in no great repute at the tables of the luxurious, where their deformed figure would be no objection to their being introduced.

Of all animals of the shelly tribe, the PHOLADES are the most wonderful. These animals are found in different places; sometimes clothed in their proper shell, at the bottom of the water; sometimes concealed in lumps of marly earth; and sometimes lodged, shell and all, in the body of the hardest marble. In their proper shell they assume different figures; but, in general, they somewhat resemble a muscle, except that their shell is found actually composed of five or more pieces, the smaller valves serving to close up the openings left by the irregular meeting of the two principal shells. But their penetration into rocks, and their residence there, makes up the most wonderful part of their history.

This animal, when divested of its shell, resembles a roundish, soft pudding, with no instrument that seems in the least fitted for boring into stones, or even penetrating the softest substance. It is furnished with two teeth indeed; but these are placed in such a situation as to be incapable of touching the hollow surface of its stony dwelling: it has also two covers to its shell, that open and shut at either end; but these are totally unserviceable to it as a miner. The instrument with which it performs all its operations, and buries itself in the hardest rocks, is only a broad fleshy substance, somewhat resembling a tongue, that is seen issuing from the bottom of its shell. With this soft, yielding instrument, it perforates the most solid marbles; and having, while yet little and young, made its way, by a very narrow entrance into the substance of the stone, it then begins to grow bigger, and thus to enlarge its apartment.

* Anderson's History of Greenland.

When it has buried its body in a stone, it there continues for life, at its ease; the sea-water that enters at the little aperture supplying it with luxurious plenty. When the animal has taken too great a quantity of water, it is seen to spurt it out of its hole with some violence. Upon this seemingly thin diet, it quickly grows larger, and soon finds itself under a necessity of enlarging its habitation and its shell. The motion of the pholas is slow beyond conception; its progress keeps pace with the growth of its body; and, in proportion as it becomes larger, it makes its way farther into the rock. When it has got a certain way in, it then turns from its former direction, and hollows downward; till, at last, when its habitation is completed, the whole apartment resembles the bole of a tobacco-pipe; the hole in the flank being that by which the animal entered.

But they are not supplied only with their rocky habitation; they have also a shell to protect them: this shell grows upon them in the body of the rock, and seems a very unnecessary addition to their defence, which they have procured themselves by art. These shells take different forms, and are often composed of a different number of valves; sometimes six; sometimes but three; sometimes the shell resembles a tube with holes at either end, one for the mouth, and the other for voiding the excrements.

This animal is found in greatest numbers at Ancona, in Italy; it is found along the shores of Normandy and Poitou, in France; it is found also upon some of the coasts of Scotland: and, in general, is considered as a very great delicacy, at the tables of the luxurious.

C H A P. XXXIII.

Of Amphibious Animals.—The Frog.—The Toad.—Varieties.—Surinam Toad.—Of Lizards.—The Crocodile and Alligator.—The open-bellied Crocodile.—The Salamander.—The Cordyle, &c.—The Iguana.—The Cameleon.—The Dragon.—The Chalcidian Lizard.

IF we emerge from the deep, the first and most obvious class of amphibious animals that occur upon land are frogs and toads.

To describe the form of animals so well known would be superfluous; to mark those differences that distinguish them from each other may be necessary. The frog moves by leaping; the toad crawls along the ground: the frog is in general less than the toad; its colour is brighter, and with
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a more polished surface: the toad is brown, rough, and dusty. The frog is light and active, and its belly comparatively small; the toad is slow, swollen, and incapable of escaping. The frog, when taken, contracts itself so as to have a lump on its back; the toad's back is straight and even. Their habitudes and manners exhibit a greater variety, and require a separate description.

The external figure of the FROG is too well known to need a description. Its power of taking large leaps is remarkably great, compared to the bulk of its body: and it is the best swimmer of all four-footed animals.

If we examine this animal internally, we shall find that it has very little brain for its size; a very wide swallow; a stomach seemingly small, but capable of great distension. The heart in the frog, as in all other animals that are truly amphibious, has but one ventricle; so that the blood can circulate without the assistance of the lungs, while it keeps under water. The lungs resemble a number of small bladders joined together, like the cells of a honey-comb: they are connected to the back by muscles, and can be distended or exhausted at the animal's pleasure. Neither male nor female have any of the external instruments of generation; the anus serving for that purpose in both. Such are the most striking peculiarities in the anatomy of a frog; and in these it agrees with the toad, the lizard, and the serpent.

The female is impregnated neither by the mouth, as some philosophers imagine, nor by the excrescence at the thumbs, as was the opinion of Linnæus, but by the insperision of the male feminal fluid upon the eggs as they proceed from the body.

A single female produces from six to eleven hundred eggs at a time; and, in general, she throws them all out together by a single effort; though sometimes she is an hour in performing this task.

When the spawn is emitted and impregnated by the male, it drops to the bottom. The eggs, which during the four first hours suffer no perceptible change, begin then to enlarge and grow lighter; by which means they mount to the surface of the water. The twenty-first day the egg is seen to open a little on one side, and the beginning of a tail to peep out, which becomes more and more distinct every day. The thirty-ninth day the little animal begins to have motion; it moves at intervals its tail; and it is perceived that the liquor in which it is circumfused, serves it for nourishment. In two days more, some of these little creatures fall to the bottom; while others remain swimming in the fluid round them, while their vivacity and motion is seen to encrease.

crease. Those which fall to the bottom remain there the whole day ; but having lengthened themselves a little, for hitherto they are doubled up, they mount at intervals to the mucus, which they had quitted, and are seen to feed upon it with great vivacity. The next day they acquire their tadpole form. In three days more they are perceived to have two little fringes, that serve as fins beneath the head ; and these in four days after assume a more perfect form. It is then also that they are seen to feed very greedily upon the pond-weed. When ninety-two days old, two small feet are seen beginning to burgeon near the tail ; and the head appears to be separate from the body. In five days after this they refuse all vegetable food ; their mouth appears furnished with teeth ; and their hinder legs are completely formed. In two days more the arms are completely produced. In this state it continues for about six or eight hours ; and then the tail dropping off by degrees, the animal appears in its most perfect form.

Thus the frog, in less than a day, having changed its figure, is seen to change its appetites also. As soon as the animal acquires its perfect state, from having fed upon vegetables it becomes carnivorous, and lives entirely upon worms and insects. But as the water cannot supply these, it is obliged to quit its native element, and seek for food upon land, where it lives by hunting worms and taking insects by surprise.

The frog lives for the most part out of the water ; but when the cold nights begin to set in, it returns to its native element, always chusing stagnant waters, where it can lie without danger concealed at the bottom. In this manner it continues torpid, or with but very little motion, all the winter : like the rest of the dormant race, it requires no food ; and the circulation is slowly carried on without any assistance from the air.

The difference of sexes, which was mentioned above, is not perceivable in these animals, until they have arrived at their fourth year ; nor do they begin to propagate, till they have completed that period. By comparing their slow growth with their other habitudes, it would appear, that they live about twelve years ; but having so many enemies, both by land and water, it is probable that few of them arrive at the end of their term.

Frogs live upon insects of all kinds ; but they never eat any, unless they have motion. They continue fixed and immoveable till their prey appears ; and just when it comes sufficiently near, they jump forward with great agility, dart out their tongues, and seize it with certainty. The tongue

In this animal, as in the toad, lizard and serpent kinds, is extremely long, and formed in such a manner that it swallows the point down its throat; so that a length of tongue is thus drawn out, like a sword from its scabbard, to assail its prey. This tongue is furnished with a glutinous substance; and whatever insect it touches, infallibly adheres, and is thus held fast till it is drawn into the mouth.

The croaking of frogs is well known; whence in some countries, they are distinguished by the ludicrous title of Dutch Nightingales. The large water frogs have a note as loud as the bellowing of a bull; and, for this purpose, puff up the cheeks to a surprising magnitude. Of all frogs, however, the male only croaks; the female is silent; before wet weather, their voices are in full exertion; they are then heard with unceasing assiduity, sending forth their call, and welcoming the approaches of their favourite moisture. No weather-glass was ever so true as a frog in foretelling an approaching change. This may probably serve to explain an opinion which some entertain, that there is a month in the year, called Paddock Moon, in which the frogs never croak: the whole seems to be no more than that, in the hot season, when the moisture is dried away, and consequently when these animals neither enjoy the quantity of health nor food that at other times they are supplied with, they shew, by their silence, how much they are displeased with the weather.

As frogs adhere closely to the backs of their own species, so it has been found, by repeated experience, they will also adhere to the backs of fishes. Few that have ponds, but know that these animals will stick to the backs of carp, and fix their fingers in the corner of each eye. In this manner they are often caught together; the carp blinded and wasted away.

THE TOAD.] If we regard the figure of the toad, there seems nothing in it that should disgust more than that of the frog. Its form and proportions are nearly the same; and it chiefly differs in colour, which is blacker; and its slow and heavy motion, which exhibits nothing of the agility of the frog: yet such is the force of habit, begun in early prejudice, that those who consider the one as an harmless, playful animal, turn from the other with horror and disgust. The frog is considered as a useful assistant, in ridding our grounds of vermin; the toad, as a secret enemy, that only wants an opportunity to infect us with its venom.

As the toad bears a general resemblance in figure to the frog, so also it resembles that animal in its nature and appetites.

tites. When like the frog, these animals have undergone all the variations of their tadpole state, they forsake the water, and are often seen, in a moist summer's evening, crawling up, by myriads, from fenny places, into drier situations. There, having found out a retreat, or having dug themselves one with their mouth and hands, they lead a patient solitary life, seldom venturing out, except when the moisture of a summer's evening invites them abroad. At that time the grass is filled with snails, and the pathways covered with worms, which make their principal food. Insects also of every kind they are fond of; and we have the authority of Linnæus for it, that they sometimes continue immovable, with the mouth open, at the bottom of shrubs, where the butterflies, in some measure fascinated, are seen to fly down their throats.

In a letter from Mr. Arscott, there are some curious particulars relating to this animal, which throws great light upon its history. "Concerning the toad," says he, "that lived so many years with us, and was so great a favourite, the greatest curiosity was its becoming so remarkably tame: it had frequented some steps before our hall door some years before my acquaintance commenced with it, and had been admired by my father for its size (being the largest I ever met with) who constantly paid it a visit every evening. I knew it myself above thirty years; and by constantly feeding it, brought it to be so tame, that it always came to the candle and looked up, as if expecting to be taken up and brought upon the table, where I always fed it with insects of all sorts. It was fondest of flesh maggots, which I kept in bran; it would follow them, and when within a proper distance, would fix his eyes and remain motionless, for near a quarter of a minute, as if preparing for the stroke, which was an instantaneous throwing of its tongue at a great distance upon the insect, which stuck to the tip by a glutinous matter. The motion is quicker than the eye can follow. I cannot say how long my father had been acquainted with the toad, before I knew it; but when I was first acquainted with it, he used to mention it as the old toad I have known so many years. I can answer for thirty-six years. This old toad made its appearance as soon as the warm weather came; and I always concluded it retired to some dry bank, to repose till spring. When we new laid the steps, I had two holes made in the third step, on each with a hollow of more than a yard long for it; in which I imagine it slept,

“ as it came thence at its first appearance. It was seldom
 “ provoked. Neither that toad, nor the multitudes I have
 “ seen tormented with great cruelty, ever shewed the least
 “ desire of revenge, by spitting or emitting any juice from
 “ their pimples. Sometimes, upon taking it up, it would
 “ let out a great quantity of clear water, which as I have
 “ often seen it do the same upon the steps when quite quiet,
 “ was certainly its urine, and no more than a natural evacu-
 “ ation. Spiders, millepedes, and flesh maggots, seem
 “ to be this animal’s favourite food. I imagine if a bee
 “ was to be put before a toad, it would certainly eat it to
 “ its cost *; but as bees are seldom stirring at the same
 “ time that toads are, they rarely come in their way; as
 “ they do not appear after sun-rising, or before sun-set.
 “ In the heat of the day they will come to the mouth
 “ of their hole, I believe for air. I once, from my par-
 “ lour window, observed a large toad I had in the bank
 “ of a bowling-green, about twelve at noon, a very hot
 “ day, very busy and active upon the grass. So uncom-
 “ mon an appearance made me go out to see what it was;
 “ when I found an innumerable swarm of winged ants had
 “ dropped round his hole; which temptation was as irresistible
 “ as a turtle would be to a luxurious alderman. In respect
 “ to its end, had it not been for a tame raven, I make no
 “ doubt but it would have been now living. This bird,
 “ one day seeing it at the mouth of its hole, pulled it out,
 “ and, although I rescued it, pulled out one eye, and hurt
 “ it so, that notwithstanding its living a twelvemonth, it
 “ never enjoyed itself, and had a difficulty of taking its
 “ food, missing the mark for want of its eye. Before that
 “ accident, it had all the appearance of perfect health.”
 The toad, contrary to vulgar prejudice, is an harmless, de-
 fenceless creature, torpid and unvenomous, and seeking the
 darkest retreats, not from the malignity of its nature, but
 the multitude of its enemies.

Like all of the frog kind, the toad is torpid in winter. It
 chuses then for a retreat either the hollow root of a tree, the
 cleft of a rock, or sometimes the bottom of a pond, where
 it is found in a state of seeming insensibility. As it is very
 long-lived, it is very difficult to be killed; its skin is tough,
 and cannot be easily pierced; and, though covered with
 wounds, the animal continues to shew signs of life, and
 every part appears in motion. But what shall we say to its

* Ræsel tried a frog; it swallowed the bee alive; its stomach was
 stung, and the animal vomited it up again.

living for centuries lodged in the bosom of a rock, or cased within the body of an oak tree, without the smallest access on any side, either for nourishment or air; and yet taken out alive and perfect! Stories of this kind it would be as rash to contradict as difficult to believe; we have the highest authorities bearing witness to their truth, and yet the whole analogy of nature seems to arraign them of falsehood. Bacon asserts that toads are found in this manner; Doctor Plot asserts the same; there is to this day a marble chimney-piece at Chatsworth with the print of the toad upon it, and a tradition of the manner in which it was found. In the *Memoirs of the Academy of Sciences* there is an account of a toad found alive and healthy in the heart of a very thick elm, without the smallest entrance or egress *. In the year 1731 there was another found near Nants, in the heart of an old oak, without the smallest issue to its cell; and the discoverer was of opinion, from the size of the tree, that the animal could not have been confined there less than eighty or a hundred years, without sustenance and without air.

Of this animal there are several varieties; such as the water and the land toad, which probably differ only in the ground-colour, of their skin. In the first, it is more inclining to ash-colour, with brown spots; in the other, the colour is brown, approaching to black. The water toad is not so large as the other; but both equally breed in that element. The size of the toad with us is generally from two to four inches long; but, in the fenny countries of Europe, I have seen them much larger; and not less than a common crab. But this is nothing to what they are found in some of the tropical climates, where travellers often, for the first time, mistake a toad for a tortoise. Their usual size is from six to seven inches; but there are some still larger, and as broad as a plate. Of these some are beautifully streaked and coloured; some studded over, as if with pearls; others bristled with horns or spines; some have the head distinct from the body, while others have it so sunk in, that the animal appears without a head. With us the opinion of its raining toads and frogs, has long been justly exploded; but it still is entertained in the tropical countries, and that not only by the savage natives, but the more refined settlers, who are apt enough to add the prejudices of other nations to their own.

It would be a tedious, as well as a useless task, to enter into all the minute discriminations of these animals, as found

* Vide the Year 1719.

in different countries or places; but the PIPAL or the SURINAM TOAD, is too strange a creature, not to require an exact description.

This animal is in form more hideous than even the common toad. The body is flat and broad; the head small; the jaws, like those of a mole, are extended, and evidently formed for rooting in the ground: the skin of the neck forms a sort of wrinkled collar: the colour of the head is of a dark chesnut, and the eyes are small: the back, which is very broad, is of a lightish grey, and seems covered over with a number of small eyes, which are round, and placed at nearly equal distances. These eyes are very different from what they seem; they are the animal's eggs covered with their shells, and placed there for hatching. These eggs are buried deep in the skin, and in the beginning of incubation but just appear; and are very visible when the young animal is about to burst from its confinement. They are of a reddish, shining yellow colour; and the spaces between them are full of small warts, resembling pearls.

In this manner the pipal is seen travelling with her wondrous family on her back, in all the different stages of maturity. Some of the strange progeny, not yet come to sufficient perfection, appear quite torpid, and as yet without life in the egg: others seem just beginning to rise through the skin; here peeping forth from the shell; and there, having entirely forsaken their prison: some are sporting at large upon the parent's back; and others descending to the ground, to try their own fortune below.

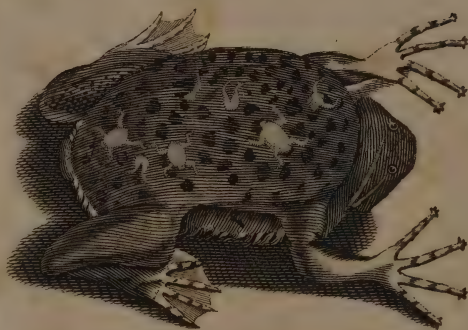
OF LIZARDS.] It is no easy matter to tell to what class in nature lizards are chiefly allied. They are unjustly raised to the rank of beasts, as they bring forth eggs, dispense with breathing, and are not covered with hair. They cannot be placed among fishes, as the majority of them live upon land: they are excluded from the serpent tribe, by their feet, upon which they run with some celerity; and from the insects, by their size; for though the Newt may be looked upon in this contemptible light, a crocodile would be a terrible insect indeed.

As lizards thus differ from every other class of animals, they also differ widely from each other. With respect to size, no class of beings has its ranks so opposite.

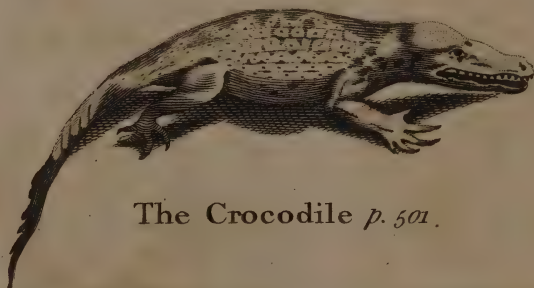
The colour of these animals also is very various, as they are found of a hundred different hues, green, blue, red, chesnut, yellow, spotted, streaked, and marbled. Were colour



The Bull Frog p. 494



The Surinam Toad p. 500



The Crocodile p. 501.

lour alone capable of constituting beauty, the lizard would often please; but there is something so repressing in the animal's figure, that the brilliancy of its scales, or the variety of its spots, only tend to give an air of more exquisite venom, of greater malignity. The figure of these animals is not less various; sometimes swollen in the belly; sometimes pursed up at the throat; sometimes with a rough set of spines on the back, like the teeth of a saw; sometimes with teeth, at others with none; sometimes venomous, at others harmless, and even philanthropic: sometimes smooth and even; sometimes with a long, slender tail; and often with a shorter blunt one.

But their greatest distinction arises from their manner of bringing forth their young: some of them are viviparous; some are oviparous; and some bring forth small spawn, like fishes.

THE CROCODILE is an animal placed at a happy distance from the inhabitants of Europe, and formidable only in those regions where men are scarce, and arts are but little known. In all the cultivated and populous parts of the world, the great animals are entirely banished, or rarely seen. The appearance of such raises at once a whole country up in arms to oppose their force; and their lives generally pay the forfeit of their rashness.

To look for this animal in all its natural terrors, grown to an enormous size, propagated in surprising numbers, and committing unceasing devastations, we must go to the uninhabited regions of Africa and America, to those immense rivers that roll through extensive and desolate kingdoms, where arts have never penetrated, where force only makes distinction, and the most powerful animals exert their strength with confidence and security.

Of this terrible animal there are two kinds; the Crocodile, properly so called, and the Cayman or Alligator. Travellers, however, have rather made the distinction than Nature; for in the general outline, and in the nature of these two animals they are entirely the same. The distinctions usually made between the crocodile and alligator are these: the body of the crocodile is more slender than that of the alligator; its snout runs off tapering from the forehead, like that of a greyhound; while that of the other is indented, like the nose of a lap-dog. The crocodile has also a much wider swallow, and is of an ash-colour.

This animal grows to a great length, being sometimes found 30 feet long, from the tip of the snout to the end of

the tail ; its most usual length, however, is 18. One which was dissected by the Jesuits at Siam was 18 feet and an half. French measure, in length ; of which the tail was no less than 5 feet and an half, and the head and neck above 2 feet and an half. It was 4 feet 9 inches in circumference, where thickest. The fore legs had the same parts and conformation as the arms of a man, both within and without. The hands, if they may be so called, had five fingers ; the two last of which had no nails, and were of a conical figure. The hinder legs, including the thigh and paw, were 2 feet 2 inches long ; the paws, from the joint to the extremity of the longest claws, were above 9 inches : they were divided into four toes, of which three were armed with large claws, the longest of which was an inch and an half : these toes were united by a membrane, like those of a duck, but much thicker. The head was long, and had a little rising at the top ; but the rest was flat, and especially towards the extremity of the jaws. It was covered by a skin, which adhered firmly to the skull and to the jaws. The skull was rough and unequal in several places. The eye was very small, in proportion to the rest of the body. The jaws seemed to shut one within the other ; and nothing can be more false than that the animal's under jaw is without motion ; it moves, like the lower jaw in all other animals, while the upper is fixed to the skull, and absolutely immoveable. The animal had twenty-seven cutting teeth in the upper jaw, and fifteen in the lower, with several void spaces between them. The distance of the two jaws, when opened as wide as they could be, was 15 inches and a half : this is a very wide yawn, and could easily enough take in the body of a man. From the shoulders to the extremity of the tail, the animal was covered with large scales, of a square form, disposed like parallel girdles. The creature was covered not only with these, but all over with a coat of armour ; which, however, was not proof against a musquet-ball, contrary to what has been commonly asserted. It had no bladder ; but the kidneys sent the urine to be discharged by the anus. There were sixty-two joints in the back-bone, which, though very closely united, had sufficient play to enable the animal to bend like a bow to the right and the left ; so that what we hear of escaping the creature by turning out of the right line, and of the animal's not being able to wheel readily after its prey, seems to be fabulous.

Such is the figure and conformation of this formidable animal, that unpeoples countries, and makes the most navigable

gable rivers desert and dangerous. They are seen in some places, lying for whole hours, and even days, stretched in the sun, and motionless; so that one not used to them, might mistake them for trunks of trees, covered with a rough and dry bark; but the mistake would soon be fatal, if not prevented: for the torpid animal, at the near approach of any living thing, darts upon it with instant swiftness, and at once drags it down to the bottom. In the times of an inundation, they sometimes enter the cottages of the natives, where the dreadful visitant seizes the first animal it meets with. There have been several examples of their taking a man out of a canoe in the sight of his companions, without their being able to lend him any assistance.

The strength of every part of the crocodile is very great; and its arms, both offensive and defensive, irresistible. Most naturalists have remarked, from the shortness of its legs, the amazing strength of the tortoise: but what is the strength of such an animal, compared to that of the crocodile, whose legs are very short, and whose size is so superior? Its principal instrument of destruction is the tail: with a single blow of this it has often overturned a canoe, and seized upon the poor savage, its conductor.

Though not so powerful, yet it is very terrible even upon land. The crocodile seldom, except when pressed by hunger, or with a view of depositing its eggs, leaves the water. Its usual method is to float along upon the surface, and seize whatever animals come within its reach; but when this method fails, it then goes closer to the bank. Disappointed of its fishy prey, it there waits covered up among the sedges, in patient expectation of some land animal that comes to drink; the dog, the bull, the tiger, or man himself. Nothing is to be seen of the insidious destroyer as the animal approaches; nor is its retreat discovered till it be too late for safety. It seizes the victim with a spring, and goes at a bound much faster than so unwieldy an animal could be thought capable of; then having secured the creature with both teeth and claws, it drags it into the water, instantly sinks with it to the bottom, and in this manner quickly drowns it.

Sometimes it happens that the creature the crocodile has thus surprised escapes from its grasp wounded, and makes off from the river-side. In such a case, the tyrant pursues with all its force, and often seizes it a second time; for, though seemingly heavy, the crocodile runs with great celerity. In this manner it is sometimes seen above half a mile from the

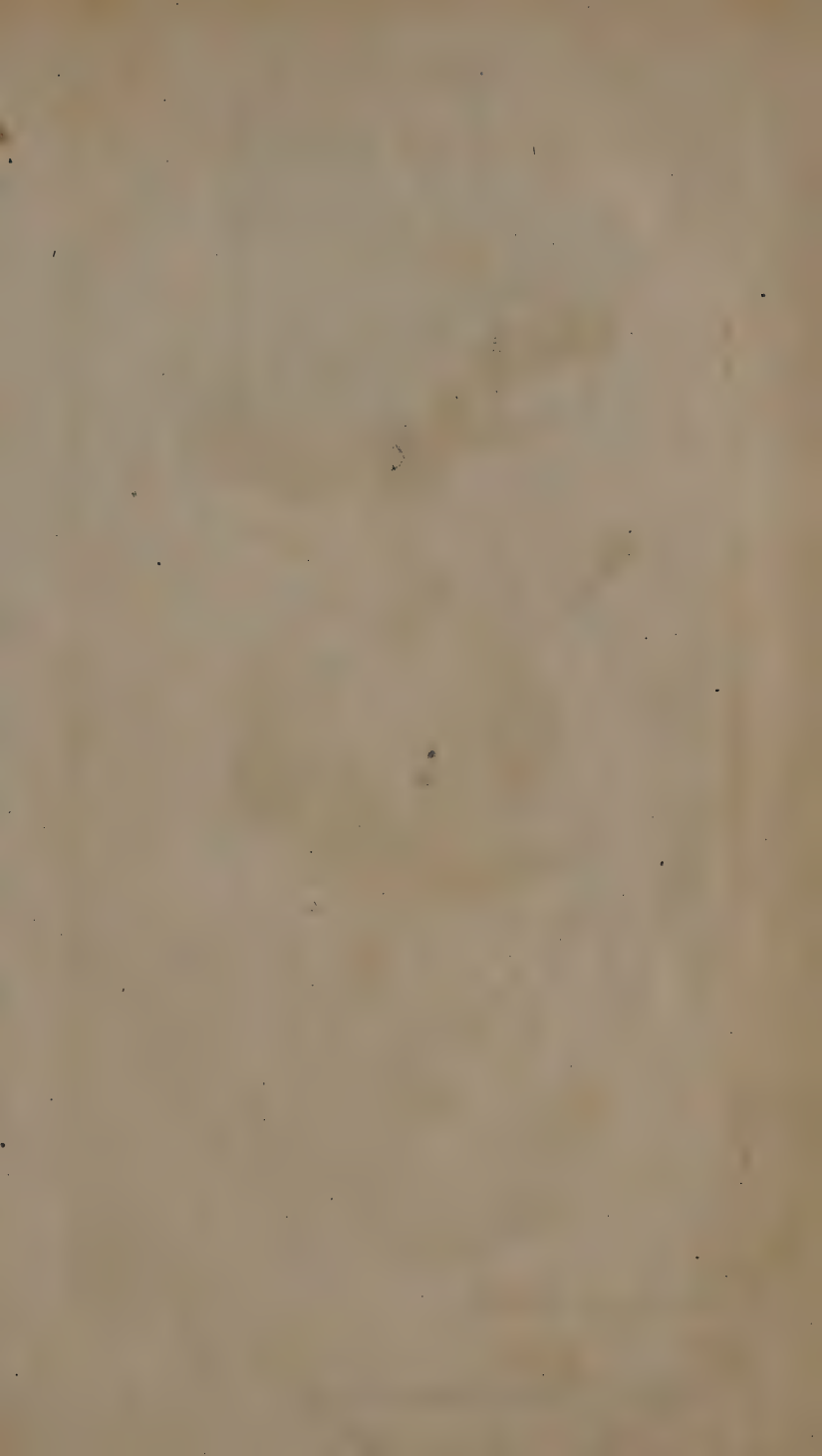
bank, in pursuit of an animal wounded beyond the power of escaping, and then dragging it back to the river-side, where it feasts in security.

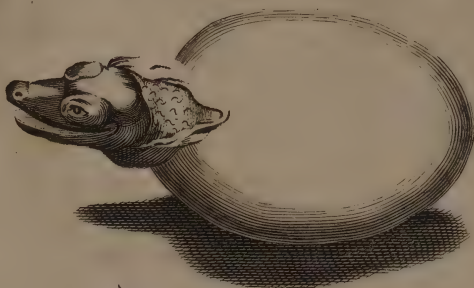
It often happens, in its depredations along the bank, that the crocodile seizes on a creature as formidable as itself, and meets with a most desperate resistance. We are told of frequent combats between the crocodile and the tiger. All creatures of the tiger kind are continually oppressed by a parching thirst, that keeps them in the vicinity of great rivers, whither they descend to drink very frequently. It is upon these occasions that they are seized by the crocodile; and they die not unrevenged. The instant they are seized upon, they turn with the greatest agility, and force their claws into the crocodile's eyes, while he plunges with his fierce antagonist into the river. There they continue to struggle for some time, till at last the tiger is drowned.

In this manner the crocodile seizes and destroys all animals, and is equally dreaded by all. There is no animal, but man alone, that can combat it with success. We are assured by Labat, that a Negro, with no other weapons than a knife in his right hand, and his left arm wrapped round with a cow's hide, ventures boldly to attack this animal in its own element. As soon as he approaches the crocodile, he presents his left arm, which the animal swallows most greedily; but sticking in his throat, the Negro has time to give it several stabs under the throat; and the water also getting in at the mouth, which is held involuntarily open, the creature is soon bloated up as big as a tun, and expires.

Whatever be the truth of these accounts, certain it is, that crocodiles are taken by the Siamese in great abundance. The manner of taking it, is, by throwing three or four strong nets across a river, at proper distances from each other; so that, if the animal breaks through the first, it may be caught by one of the rest. When it is first taken, it employs its tail with great force; but, after many unsuccessful struggles, it is at last exhausted. Then the natives approach their prisoner in boats, and pierce him with their weapons in the most tender parts, till he is weakened with the loss of blood. When he has done stirring, they begin by tying up his mouth; and with the same cord, they fasten his head to his tail; which last they bend back like a bow. They are not, however, yet perfectly secure from his fury; but, for their greater safety, they tie his fore feet, as well as those behind, to the top of his back.

The.

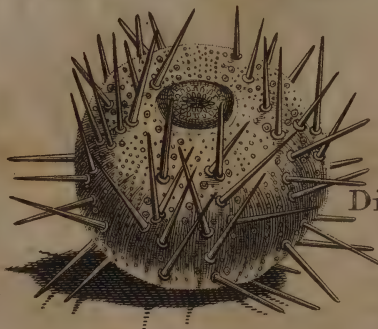




The Crocodiles Egg p. 505



The Sea Urchin p. 490



Ditto p. 490

The crocodile, thus brought into subjection, or bred up young, is used to divert and entertain the great men of the East. It is often managed like an horse: a curb is put into its mouth, and the rider directs it as he thinks proper. Though awkwardly formed, it does not fail to proceed with some degree of swiftness, and is thought to move as fast as some of the most unwieldy of our own animals, the hog, or the cow.

Along the rivers of Africa, this animal is sometimes taken in the same manner as the shark. Several Europeans go together in a large boat, and throw out a piece of beef upon a hook and strong fortified line, which the crocodile seizing and swallowing, is drawn along, floundering and struggling until its strength is quite exhausted, when it is pierced in the belly, which is its tenderest part; and thus, after numberless wounds, is drawn ashore. In this part of the world also, as well as at Siam, the crocodile makes an object of savage pomp, near the palaces of their monarchs. Philips informs us, that at Sabi, on the Slave Coast, there are two pools of water near the Royal Palace, where crocodiles are bred, as we breed carp in our ponds in Europe.

There is a very powerful smell of musk about all these animals. Travellers are not agreed in what part of the body these musk-bags are contained; but the most probable opinion is, that this substance is amassed in glands under the legs and arms. The crocodile's flesh is, at best, very bad, tough eating; but, unless the musk-bags be separated, it is insupportable. The Negroes themselves cannot well digest the flesh; but a crocodile's egg is to them the most delicate morsel in the world.

All crocodiles breed near fresh waters; and for this purpose, the female, when she comes to lay, chooses a place by the side of a river, or some fresh-water lake, to deposit her brood in. She always pitches upon an extensive sandy shore, where she may dig a hole without danger of detection from the ground being fresh turned up. There she deposits from eighty to an hundred eggs, of the size of a tennis-ball, and of the same figure, covered with a tough, white skin, like parchment. She takes above an hour to perform this task; and then, covering up the place so artfully that it can scarcely be perceived, she goes back to return again the next day. Upon her return, with the same precaution as before, she lays about the same number of eggs; and the day following also a like number. Thus, having deposited her whole quantity, and having covered them

them close up in the sand, they are soon vivified by the heat of the sun ; and, at the end of thirty days, the young ones begin to break open the shell. At this time, the female is instinctively taught that her young ones want relief ; and she goes up on land, to scratch away the sand, and set them free. Her brood quickly avail themselves of their liberty ; a part run unguided to the water ; another part ascend the back of the female, and are carried thither in greater safety. But the moment they arrive at the water, all natural connection is at an end. The whole brood scatters into different parts at the bottom ; by far the greatest number are destroyed : and the rest find safety in their agility or minuteness.

The Open-bellied Crocodile is furnished with a false belly, like the opossum, where the young creep out and in, as their dangers or necessities require. It is probable that this Open-bellied Crocodile is viviparous, and fosters her young that are prematurely excluded, in this second womb, until they come to proper maturity.

THE SALAMANDER.] The ancients have described a lizard that is bred from heat, that lives in the flames, and feeds upon fire, as its proper nourishment. It will be needless to say that there is no such animal existing ; and that, above all others, the modern Salamander has the smallest affinity to such an abode.

There have been not less than seven sorts of this animal described by Seba ; and to have some idea of the peculiarity of their figure, if we suppose the tail of a lizard applied to the body of a frog, we shall not be far from precision.

But it is not in figure that this animal chiefly differs from the rest of the lizard tribe. In conformation it is unlike, as the salamander is produced alive from the body of its parent, and is completely formed the moment of its exclusion. It differs from them also in its general reputation of being venomous ; no trials, however, that have been hitherto made, seem to confirm the truth of the report.

The salamander best known in Europe, is from eight to eleven inches long, usually black, spotted with yellow ; and when taken in the hand, feeling cold to a great degree. There are several kinds. Our Black Water Newt is reckoned among the number. The idle report of its being incombustible by fire, has caused many of these poor animals to be burnt ; but we cannot say as philosophical martyrs ; since scarce any philosopher could think it necessary to make

the experiment. When thrown into the fire, the animal is seen to burst with the heat of its situation, and to eject its fluids. We are gravely told in the Philosophical Transactions, that this is a method the animal takes to extinguish the flames.

The whole of the lizard kind are so tenacious of life, that they will live several hours after the loss of the head : they also sustain the want of food in a surprising manner. One of them, brought from the Indies, lived nine months, without any other food than what it received from licking a piece of earth on which it was brought over * ; another was kept by Seba in an empty vial for six months, without any nourishment ; and Redi talks of a large one, brought from Africa, that lived for eight months, without taking any nourishment whatever. Indeed, as many of this kind, both salamanders and lizards, are torpid, or nearly so, during the winter, the loss of their appetite for so long a time is the less surprising.

Directly descending from the crocodile, in this class, we find the CORDYLE, the TOCKAY, and the TEJUGUACU, all growing less in order, as I have named them. These fill up the chasm to be found between the crocodile and the African Iguana.

THE IGUANA, which deserves our notice, is about three feet long, and the body about as thick as one's thigh. The skin is covered with small scales, like those of a serpent ; and the back is furnished with a row of prickles, that stand up, like the teeth of a saw. Both the jaws are full of very sharp teeth ; and the bite is dangerous, though not venomous. The male has a skin hanging under his throat, which reaches down to his breast ; and, when displeased, he puffs it up like a bladder : he is one third larger and stronger than the female, though the strength of either avails them little towards their defence. The males are ash-coloured, and the females are green.

The flesh of these may be considered as the greatest delicacy of Africa and America ; and the sportsmen of those climates go out to hunt the iguana, as we do in pursuit of the pheasant or the hare. In the beginning of the season, when the great floods of the tropical climates are past away, and vegetation starts into universal verdure, the sportsmen

* Phil. Trans. ann. 1661, N. 21. art. 7.

are seen, with a noose and a stick, wandering along the sides of the rivers, to take the iguana. This animal, though apparently formed for combat, is the most harmless creature of all the forest: it lives among the trees, or sports in the water, without ever offering to offend. There, having fed upon the flowers of the mahot, and the leaves of the mapou, that grow along the banks of the stream, it goes to repose upon the branches of the trees that hang over the water. Upon land, the animal is swift of foot; but, when once in possession of a tree, it seems conscious of the security of its situation, and never offers to stir. There the sportsman easily finds it, and as easily fastens his noose round its neck. If the head be placed in such a manner that the noose cannot readily be fastened, by hitting the animal a blow on the nose with the stick, it lifts the head, and offers it in some measure to the noose. In this manner, and also by the tail, the iguana is dragged from the trees, and killed by repeated blows on the head.

The CAMELEON is a very different animal; and as the iguana satisfies the appetites of the epicure, this is rather the feast of the philosopher. Like the crocodile, this little animal proceeds from an egg; and it also nearly resembles that formidable creature in form.

The head of a large cameleon is almost two inches long; and thence to the beginning of the tail, four and a half; the tail is five inches long, and the feet two and a half; the thickness of the body is different at different times; for sometimes, from the back to the belly, it is two inches, and sometimes but one; for it can blow itself up, and contract itself, at pleasure. This swelling and contraction is not only of the back and belly, but of the legs and tail.

The cameleon has a power of driving the air it breathes over every part of the body: however, it only gets between the skin and the muscles; for the muscles themselves are never swollen. The skin is very cold to the touch; and though the animal seems so lean, there is no feeling the beating of the heart. The surface of the skin is unequal, and has a grain not unlike shagreen, but very soft, because each eminence is as smooth as if it were polished. The colour of all these eminences, when the cameleon is at rest in a shady place, is of a blueish grey; and the space between is of a pale red and yellow.

But when the animal is removed into the sun, then comes the wonderful part of its history. At first, it appears

to suffer no change of colour, its greyish spots still continuing the same: but the whole surface soon seems to imbibe the rays of light; and the simple colouring of the body changes into a variety of beautiful hues. Wherever the light comes upon the body, it is of a tawny brown; but that part of the skin on which the sun does not shine, changes into several brighter colours, pale yellow, or vivid crimson; which form spots of the size of half one's finger: some of these descend from the spine half way down the back; and others appear on the sides, arms, and tail. Sometimes the animal becomes all over spotted with brown spots, of a greenish cast. When it is wrapped up in a white linen cloth for two or three minutes, the natural colour becomes much lighter; but not quite white, as some authors have pretended: however, it must not hence be concluded, that the cameleon assumes the colour of the objects which it approaches; this is entirely an error, and probably has taken its rise from the continual changes it appears to undergo.

When the cameleon changes place, and attempts to descend from an eminence, it moves with the utmost precaution, advancing one leg very deliberately before the other, still securing itself by holding whatever it can grasp by the tail. It seldom opens the mouth, except for fresh air; and when that is supplied, discovers its satisfaction by its motions, and the frequent changes of its colour. The tongue is sometimes darted out after its prey, which is flies; and this is as long as the whole body. The eyes are remarkably little, though they stand out of the head; but the most extraordinary part of their conformation is, that the animal often moves one eye, when the other is entirely at rest; nay, sometimes one eye will seem to look directly forward, while the other looks backward; and one will look upwards, while the other regards the earth.

To this class of lizards we may refer the DRAGON, a most terrible animal, if we were to credit the invention of fable and superstition. Happily, however, such ravagers are no where found to exist at present; and the whole race of dragons is dwindled down to the Flying Lizard, a little harmless creature, that only preys upon insects, and even seems to embellish the forest with its beauty.

The last animal of the lizard kind that I shall mention, is the CHALCIDIAN LIZARD, of Aldrovandus, very improperly called the Seps, by modern historians. This animal

seems to make the shade that separates the lizard from the serpent race. It has four legs, like the lizard; but so short, as to be utterly unserviceable in walking: it has a long slender body, like the serpent; and it is said to have the serpent's malignity also. These animals are found above three feet long, and thick in proportion, with a large head, and pointed snout. The whole body is covered with scales; and the belly is white, mixed with blue. It has four crooked teeth; as also a pointed tail, which, however, can inflict no wound. It is viviparous: upon the whole, it appears to bear a strong affinity to the viper; and, like that animal, its bite may be dangerous.

C H A P. XXXIV.

Of Serpents.—Of the venomous kind.—The Viper.—The Rattle-snake.—The Whip-snake.—The Asp.—The Faculus.—The Hæmorrhoids.—The Seps.—The Coral Snake.—The Cobra-capella.—Serpents without Venom.—The Black Snake.—The Blind-worm.—The Amphibæna.—The Esculapian.—The Boyuna.—The Surinam Serpent.—The Prince of Serpents.—The Gerenda.—Fibeya.—The Boiguacu.—The Depond.

OF SERPENTS.] **I**N none of the countries of Europe is the serpent tribe sufficiently numerous to be truly terrible. The various malignity also that has been ascribed to European serpents of old, is now utterly unknown; there are not above three or four kinds that are dangerous, and their poison operates in all in the same manner. A burning pain in the part, easily removeable by timely applications, is the worst effect that we experience from the bite of the most venomous serpents of Europe.

Though, however, Europe be happily delivered from these reptiles, in the warm countries that lie within the tropic, as well as in the cold regions of the north, where the inhabitants are few, the serpents propagate in equal proportion. All along the swampy banks of the river Niger or Oroonoko, where the sun is hot, the forests thick, and the men but few, the serpents cling among the branches of the trees in infinite numbers, and carry on an unceasing war against all other animals in their vicinity. Travellers have assured us that they have often seen large snakes twining round the trunk of a tall tree, encompassing it like a wreath, and thus rising and descending at pleasure. In these

these countries, therefore, the serpent is too formidable to become an object of curiosity, for it excites much more violent sensations.

We are not, therefore, to reject as wholly fabulous, the accounts left us by the ancients of the terrible devastations committed by a single serpent. It is probable, in early times, when the arts were little known, and mankind were but thinly scattered over the earth, that serpents, continuing undisturbed possessors of the forest, grew to an amazing magnitude; and every other tribe of animals fell before them. We have many histories of antiquity, presenting us such a picture; and exhibiting a whole nation sinking under the ravages of a single serpent. We are told, that while Regulus led his army along the banks of the river Bagrada, in Africa, an enormous serpent disputed his passage over. We are assured by Pliny, who says that he himself saw the skin, that it was an hundred and twenty feet long, and that it had destroyed many of the army. At last, however, the battering engines were brought out against it; and these assailing it at a distance, it was soon destroyed.

With respect to their conformation, all serpents have a very wide mouth, in proportion to the size of the head; and what is very extraordinary, they can gape and swallow the head of another animal which is three times as big as their own. To explain this, it must be observed, that the jaws of this animal do not open as ours, in the manner of a pair of hinges, where bones are applied to bones, and play upon one another; on the contrary, the serpent's jaws are held together at the roots by a stretching muscular skin; by which means they open as widely as the animal chuses to stretch them, and admit of a prey much thicker than the snake's own body. The throat, like stretching leather, dilates to admit the morsel; the stomach receives it in part; and the rest remains in the gullet, till putrefaction and the juices of the serpent's body unite to dissolve it.

As to the teeth, I shall speak more of them when I come to treat of the viper's poison. The tongue in all these animals is long and forky. It is composed of two long fleshy substances, which terminate in sharp points, and are very pliable. Some of the viper kind have tongues a fifth part of the length of their bodies; they are continually darting them out, but they are entirely harmless, and only terrify those who are ignorant of the real situation of their poison.

The skin is composed of a number of scales, united to each other by a transparent membrane, which grows harder as it grows

grows older, until the animal changes, which is generally done twice a year. This cover then bursts near the head, and the serpent creeps from it, by an undulatory motion, in a new skin, much more vivid than the former. As the edges of the foremost scales lie over the ends of their following scales, so those edges, when the scales are erected, which the animal has a power of doing in a small degree, catch in the ground, like the nails in the wheel of a chariot, and so promote and facilitate the animal's progressive motion. The erecting these scales, is by means of a multitude of distinct muscles, with which each is supplied, and one end of which is tacked each to the middle of the foregoing.

This tribe of animals, like that of fishes, seems to have no bounds put to their growth: their bones are in a great measure cartilaginous, and they are consequently capable of great extension; the older, therefore, a serpent becomes, the larger it grows; and as they seem to live to a great age, they arrive at an enormous size.

Leguat assures us, that he saw a serpent in Java, that was fifty feet long; and Carli mentions their growing to above forty feet. Mr. Wentworth, who had large concerns in the Brebices in America, assures me, that, in that country, they grow to an enormous length. He one day sent out a soldier, with an Indian, to kill wild fowl for the table; and they accordingly went some miles from the fort: in pursuing their game, the Indian, who generally marched before, beginning to tire, went to rest himself upon the fallen trunk of a tree, as he supposed it to be; but when he was just going to sit down, the enormous monster began to move, and the poor savage perceiving that he had approached a Liboya, the greatest of all the serpent kind, dropped down in an agony. The soldier, who perceived at some distance what had happened, levelled at the serpent's head, and, by a lucky aim, shot it dead: however, he continued his fire, until he was assured that the animal was killed; and then going up to rescue his companion, who was fallen motionless by its side, he, to his astonishment, found him dead likewise, being killed by the fright. Upon his return to the fort, and telling what had happened, Mr. Wentworth ordered the animal to be brought up, when it was measured, and found to be thirty-six feet long.

In the East Indies they grow also to an enormous size; particularly in the Island of Java, where, we are assured, that one of them will destroy and devour a buffalo. In a letter, printed in the German Ephemerides, we have an account

count of a combat between an enormous serpent and a buffalo, by a person, who assures us, that he was himself a spectator. The serpent had for some time been waiting near the brink of a pool, in expectation of its prey; when a buffalo was the first that offered. Having darted upon the affrighted animal, it instantly began to wrap it round with its voluminous twistings; and at every twist the bones of the buffalo were heard to crack almost as loud as the report of a cannon. It was in vain that the poor animal struggled and bellowed; its enormous enemy entwined it too closely to get free; till at length, all its bones being mashed to pieces, like those of a malefactor on the wheel, and the whole body reduced to one uniform mass, the serpent untwined its folds to swallow its prey at leisure. To prepare for this, and in order to make the body slip down the throat more glibly, it was seen to lick the whole body over, and thus cover it with its mucus. It then began to swallow it at that end that offered least resistance: while its length of body was dilated to receive its prey, and thus took in at once a morsel that was three times its own thickness. We are assured by travellers, that these animals are often found with the body of a stag in their gullet, while the horns, which they are unable to swallow, keep sticking out at their mouths.

But it is happy for mankind that the rapacity of these frightful creatures is often their punishment; for, whenever any of the serpent kind have gorged themselves in this manner, whenever their body is seen particularly distended with food, they then become torpid, and may be approached and destroyed with safety.

Other creatures have a choice in their provision; but the serpent indiscriminately preys upon all; the buffalo, the tiger, and the gazelle. One would think that the porcupine's quills might be sufficient to protect it; but whatever has life, serves to appease the hunger of these devouring creatures: porcupines, with all their quills, have frequently been found in their stomachs, when killed and opened; nay, they most frequently are seen to devour each other.

But though these animals are, above all others, the most voracious; and though the morsel which they swallow without chewing, is greater than what any other creature, either by land or water, the whale itself not excepted, can devour, yet no animals upon earth bear abstinence so long as they. A single meal, with many of the snake kind, seems

to be the adventure of a season; and is an occurrence for which they have been for weeks, nay, sometimes for months, in patient expectation of. Their prey continues, for a long time, partly in the stomach, partly in the gullet; and a part is often seen hanging out of the mouth. In this manner it digests by degrees; and in proportion as the part below is dissolved, the part above is taken in. It is not therefore till this tedious operation is entirely performed, that the serpent renews its appetite and its activity. But should any accident prevent it from issuing once more from its cell, it still can continue to bear famine for weeks, months, nay, for years together. Vipers are often kept in boxes for six or eight months, without any food whatever; and there are little serpents sometimes sent over to Europe, from Grand Cairo, that live for several years in glasses, and never eat at all, nor even stain the glass with their excrement. Thus the serpent tribe unite in themselves two very opposite qualities; wonderful abstinence, and yet incredible rapacity.

Though all serpents are amphibious, some are much fonder of the water than others; and though destitute of fins or gills, remain at the bottom, or swim along the surface with great ease. They can, however, endure to live in fresh-water only; for salt is an effectual bane to the whole tribe.

Some serpents have a most horrible fœtor attending them, which is alone capable of intimidating the brave. This proceeds from two glands near the vent, like those in the weasel or the pole-cat; and, like those animals, in proportion as they are excited by rage or by fear, the scent grows stronger. It would seem, however, that such serpents as are most venomous, are least offensive in this particular; since the rattlesnake and the viper have no smell whatever: nay, we are told that at Calcutt and Cranganor, in the East Indies, there are some very noxious serpents, who are so far from being disagreeable, that their excrements are sought after, and kept as the most pleasing perfume. The Esculapian serpent is also of this number.

Some serpents bring forth their young alive; as the viper: some bring forth eggs, which are hatched by the heat of their situation; as the common black snake, and the majority of the serpent tribe. When a reader, ignorant of anatomy, is told, that some of those animals produce their young alive, and that some produce eggs only, he is apt to suppose a very great difference in the internal conformation, which makes such a variety in the manner of bringing forth.

But

But this is not the case: these animals are internally alike, in whatever manner they produce their young; and the variety in their bringing forth, is rather a slight than a real discrimination. The only difference is, that the viper hatches her eggs, and brings them to maturity within her body; the snake is more premature in her productions, and sends her eggs into the light, some time before the young ones are capable of leaving the shell. Thus, if either are opened, the eggs will be found in the womb, covered with their membranous shell, and adhering to each other, like large beads on a string. In the eggs of both the young ones will be found, though at different stages of maturity: those of the viper will crawl and bite in the moment the shell that encloses them is broken open; those of the snake are not yet arrived at their perfect form.

Father Labat took a serpent of the viper kind, that was nine feet long, and ordered it to be opened in his presence. He then saw the manner in which the eggs of these animals lie in the womb. In this creature there were six eggs, each of the size of a goose egg, but longer, more pointed, and covered with a membranous skin, by which also they were united to each other. Each of these eggs contained from thirteen to fifteen young ones, about six inches long, and as thick as a goose-quill. These little mischievous animals were no sooner let loose from the shell, than they crept about, and put themselves into a threatening posture, coiling themselves up and biting the stick with which he was destroying them. In this manner he killed seventy-four young ones; those that were contained in one of the eggs escaped at the place where the female was killed, by the bursting of the egg and their getting among the bushes.

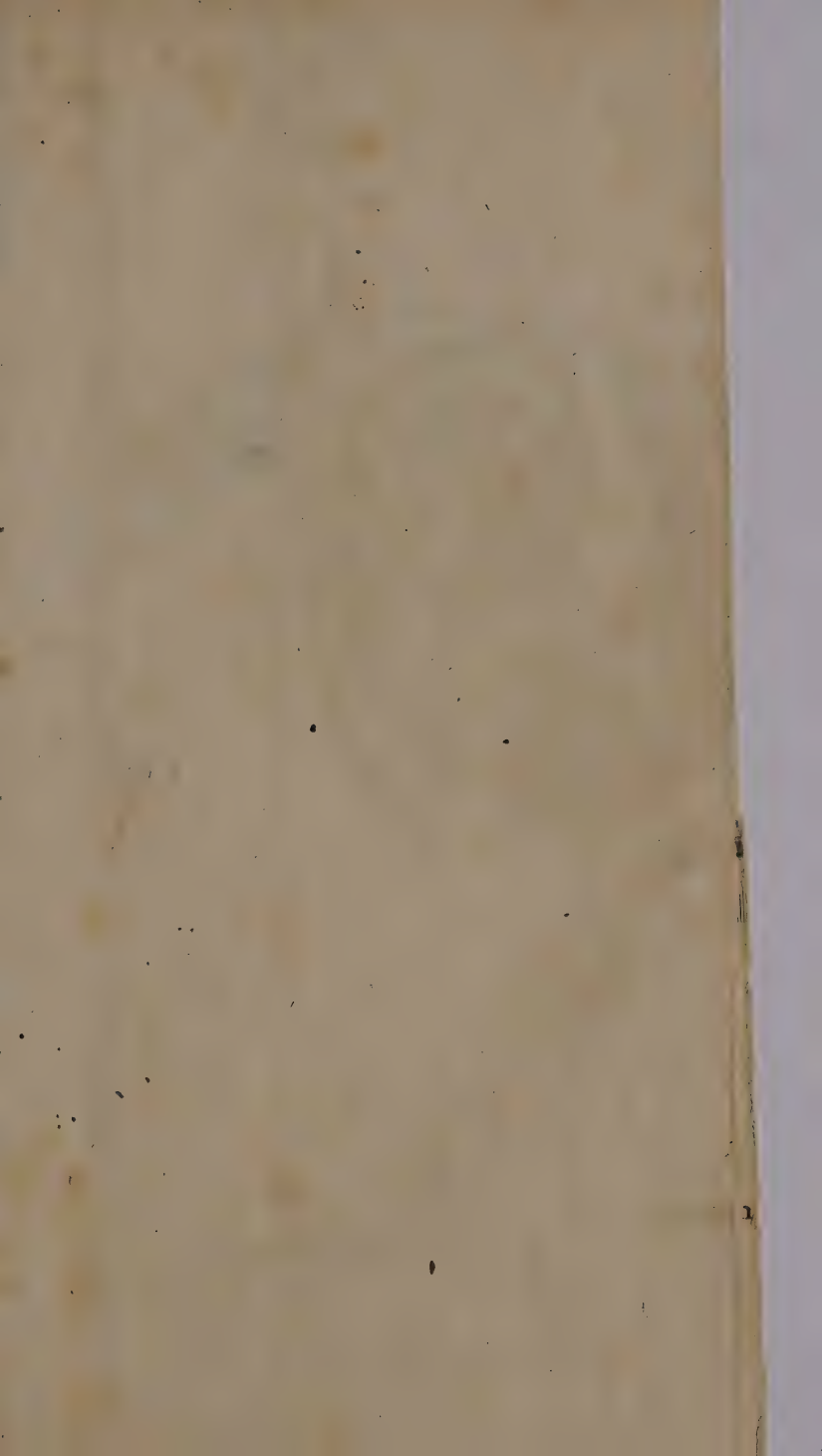
The last distinction that I shall mention, but the most material among serpents is, that some are venomous and some inoffensive, but not above a tenth of their number are actually venomous.

From these noxious qualities in the serpent kind, it is no wonder that not only man, but beasts and birds, carry on an unceasing war against them. The ichneumon of the Indians, and the peccary of America, destroy them in great numbers. These animals have the art of seizing them near the head; and it is said that they can skin them with great dexterity. The vulture and the eagle also prey upon them in great abundance; and often fousing down from the clouds, drop upon a long serpent, which they snatch struggling and writhing in the air. Dogs also are bred up to oppose them.

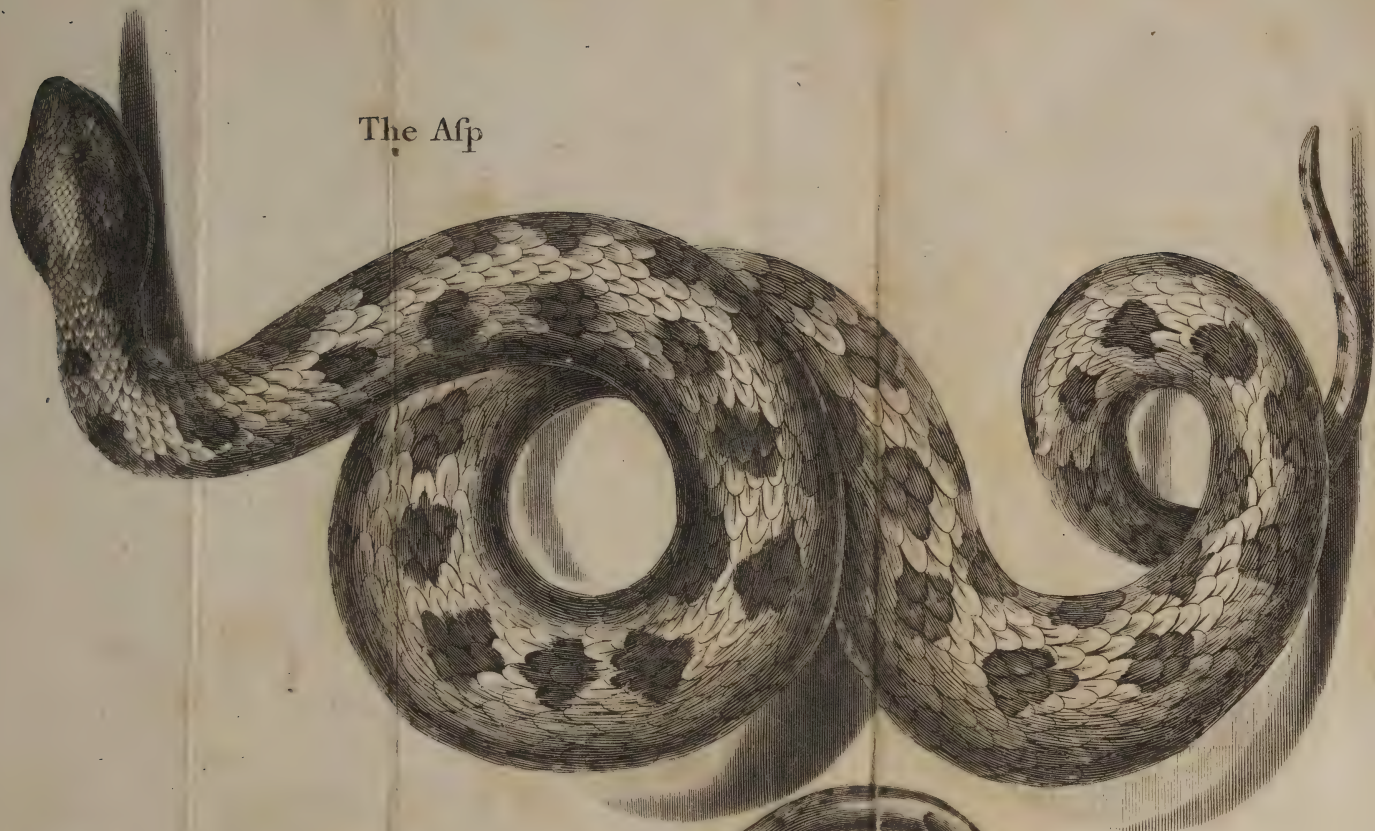
Father Feuillée tells us, that being in the woods of Martinico, he was attacked by a large serpent, which he could not easily avoid, when his dog immediately came to his relief, and seized the assailant with great courage. The serpent entwined him, and pressed him so violently, that the blood came out of his mouth, and yet the dog never ceased till he had torn it to pieces. The dog was not sensible of his wounds during the fight; but soon after his head swelled prodigiously, and he lay on the ground as dead. But his master having found, hard by, a banana tree, he applied its juice, mixed with treacle, to the wounds; which recovered the dog, and quickly healed his sores.

In India there is nothing so common as dancing serpents, which are carried about in a broad flat vessel somewhat resembling a sieve. These erect and put themselves in motion at the word of command. When their keeper sings a slow tune, they seem by their heads to keep time; when he sings a quicker measure, they appear to move more brisk and lively. All animals have a certain degree of docility; and we find that serpents themselves can be brought to move and approach at the voice of their master. From this trick successfully practised before the ignorant, it is most probable has arisen all the boasted pretensions which some have made to charming of serpents; an art to which the native Americans pretend at this very day.

[OF VENOMOUS SERPENTS.] In all countries, the poison of the serpent is sufficiently formidable to deserve notice, and to excite our attention to its nature and effects. It will therefore in the first place be proper to describe its seat in the animal, as also the instrument by which the wound is made and the poison injected. In all this venomous class of reptiles, whether the viper, the rattle-snake, or the cobra di capello, there are two large teeth or fangs that issue from the upper jaw, and that hang out beyond the lower. The rest of the snake tribe are destitute of these; and it is most probable that wherever these fangs are wanting, the animal is harmless; on the contrary, wherever they are found it is to be avoided as the most pestilent enemy. Our first great attention, therefore, upon seeing a serpent should be directed to the teeth. The black snake, the liboya, the blind worm, and a hundred others that might be mentioned, have their teeth of an equal size, fixed into the jaws, and with no other apparatus for inflicting a dangerous wound than a dog or a lizard; but it is otherwise with the venomous tribe



The Asp



The Common Viper p. 517

we are now describing; these are well furnished, not only with an elaboratory, where the poison is formed, but a canal by which it is conducted to the jaw, a bag under the tooth for keeping it ready for every occasion, and also an aperture in the tooth itself for injecting it into the wound. The venom contained in this bag is a yellowish, thick, tasteless liquor, which injected into the blood is death, yet which may be swallowed without any danger.

The fangs that give the wound are large in proportion to the size of the animal that bears them; crooked, yet sharp enough to inflict a ready wound. They grow one on each side, and sometimes two from two moveable bones in the upper jaw, which by sliding backward or forward, have a power of erecting or depressing the teeth at pleasure. In these bones are also fixed many teeth, but no way venomous, and only serving to take and hold the animal's prey. If a viper inflicts the wound, and the remedy be neglected, the symptoms are not without danger. It first causes an acute pain in the place affected, attended with a swelling, first red, and afterwards livid. To this succeed great sickness at the stomach, bilious and convulsive vomitings, cold sweats, pains about the navel, and death itself. These symptoms are much more violent, and succeed each other more rapidly after the bite of a rattle-snake; but when the person is bit by the cobra di capello, he dies in an hour, his whole frame being dissolved into a putrid mass of corruption.

In the eastern and western Indies, the number of noxious serpents is various; in this country we are acquainted only with one. The viper is the only animal of Great Britain from whose bite we have any thing to fear. In the tropical climates, the rattle-snake, the whip-snake, and the cobra di capello, are the most formidable, though by no means the most common.

VIPERS are found in many parts of Europe; but the dry, stony, and in particular the chalky countries abound with them. This animal seldom grows to a greater length than two feet; though sometimes they are found above three. The ground colour of their bodies is a dirty yellow; that of the female is deeper. The back is marked the whole length with a series of rhomboid black spots, touching each other at the points; the sides with triangular ones, the belly entirely black. It is chiefly distinguished from the common black snake by the colour, which in the latter is more beau-

tifully mottled, as well as by the head, which is thicker than the body; but particularly by the tail, which in the viper, though it ends in a point, does not run tapering to so great a length as in the other. When, therefore, other distinctions fail, the difference of the tail can be discerned at a single glance.

The viper differs from most other serpents in being much slower, as also in excluding its young compleatly formed, and bringing them forth alive. The kindness of Providence seems exerted not only in diminishing the speed, but also the fertility, of this dangerous creature. They copulate in May, and are supposed to be about three months before they bring forth, and have seldom above eleven eggs at a time. These are of the size of a blackbird's egg, and chained together in the womb like a string of beads. Each egg contains from one to four young ones; so that the whole of a brood may amount to about twenty or thirty. They continue in the womb till they come to such perfection as to be able to burst from the shell; and they are said by their own efforts to creep from their confinement into the open air, where they continue for several days without taking any food whatsoever.

The viper is capable of supporting very long abstinence, it being known that some have been kept in a box six months without food; yet during the whole time they did not abate of their vivacity. They feed only a small part of the year, but never during their confinement; for if mice, their favourite diet, should at that time be thrown into their box, though they will kill, yet they will never eat them. When at liberty, they remain torpid throughout the winter; yet, when confined, have never been observed to take their annual repose.

They are usually taken with wooden tongs, by the end of the tail, which may be done without danger; for, while held in that position, they are unable to wind themselves up to hurt their enemy: yet, notwithstanding this precaution, the viper-catchers are frequently bitten by them; but, by the application of olive-oil, the bite is effectually cured.

THE RATTLE-SNAKE is bred in America, and in no part of the old world. Some are as thick as a man's leg, and six feet in length; but the most usual size is from four to five feet long. In most particulars it resembles the viper: it differs, however, in having a large scale, which hangs like a penthouse over each eye. They are of an orange tawny, and blackish colour on the back; and of an ash-colour

colour on the belly, inclining to lead. The male may be readily distinguished from the female, by a black velvet spot on the head, and by the head being smaller and longer. But that which besides their superior malignity, distinguishes them from all other animals, is their rattle, an instrument lodged in their tail, by which they make such a loud, rattling noise, when they move, that their approach may readily be perceived, and the danger avoided. This rattle, which is placed in the tail, somewhat resembles, when taken out of the body, the curb chain of a bridle: it is composed of several thin, hard, hollow bones, linked to each other, and rattling upon the slightest motion. It is supposed by some, that the snake acquires an additional bone every year; and that, from this, its age may be precisely known: however this may be, certain it is, that the young snakes, of a year or two old, have no rattles at all; while many old ones have been killed, that had from eleven to thirteen joints each. They shake and make a noise with these rattles with prodigious quickness when they are disturbed; however, the peccary and the vulture are no way terrified at the sound, but hasten, at the signal, to seize the snake, as their most favourite prey.

It is very different with almost every other animal. The certain death which ensues from this terrible creature's bite, makes a solitude wherever it is heard. It moves along with the most majestic rapidity; neither seeking to offend the larger animals, nor fearing their insults. If unprovoked, it never meddles with any thing but its natural prey; but when accidentally trod upon, or pursued to be destroyed, it then makes a dreadful and desperate defence. It erects itself upon its tail, throws back the head, and inflicts its wound in a moment; then parts, and inflicts a second wound: after which, we are told, by some, that it remains torpid and inactive, without even attempting to escape.

The very instant the wound is inflicted, though small in itself, it appears more painful than the sting of a bee. This pain, which is so suddenly felt, far from abating, grows every moment more excruciating and dangerous: the limb swells; the venom reaches the head, which is soon of a monstrous size; the eyes are red and fiery; the heart beats quick, with frequent interruptions: the pain becomes insupportable, and some expire under it in five or six hours; but others, who are of stronger constitutions, survive the agony for a few hours longer, only to sink under a general mortification which ensues, and corrupts the whole body.

A serpent, called the WHIP-SNAKE, is still more venomous than the former. This animal, which is a native of the East, is about five feet long, yet not much thicker than the thong of a coachman's whip. It is exceedingly venomous; and its bite is said to kill in about six hours. One of the Jesuit missionaries, happening to enter into an Indian pagoda, saw what he took to be a whip-cord lying on the floor, and stooped to take it up; but, upon handling it, what was his surprize to find that it was animated, and no other than the whip-snake, of which he had heard such formidable accounts. Fortune, however, seemed favourable to him; for he grasped it by the head, so that it had no power to bite him, and only twisted its folds up his arm. In this manner he held it, till it was killed by those who came to his assistance.

To this formidable class might be added the Asp, whose bite, however, is not attended with those drowsy symptoms which the ancients ascribed to it. The JACULUS of Jamaica also, is one of the swiftest of the serpent kind. The HÆMORRHOIS, so called from the hæmorrhages which its bite is said to produce; the SEPS, whose wound is very venomous, and causes the part affected to corrupt in a very short time; the CORAL SERPENT, which is red, and whose bite is said to be fatal. But the COBRA di CAPELLO, or Hooded Serpent, inflicts the most deadly and incurable wounds. Of this formidable creature there are five or six different kinds; but they are all equally dangerous, and their bite is followed by speedy and certain death. It is from three to eight feet long, with two large fangs hanging out of the upper jaw. It has a broad neck, and a mark of dark brown on the forehead; which, when viewed frontwise, looks like a pair of spectacles; but behind, like the head of a cat. The eyes are fierce, and full of fire; the head is small, and the nose flat, though covered with very large scales, of a yellowish ash colour; the skin is white; and the large tumour on the neck is flat, and covered with oblong, smooth scales.

OF SERPENTS WITHOUT VENOM.] This class of serpents all want that artificial mechanism by which the poisonous tribe inflict such deadly wounds: they have no gland in the head for preparing venom; no conduits for conveying it to the teeth; no receptacles there; no hollow in the instrument that inflicts the wound. Their bite, when the teeth happen to be large enough to penetrate the skin,

skin, for in general they are too small for this purpose, is attended with no other symptoms than those of an ordinary puncture; and many of this tribe, as if sensible of their own impotence, cannot be provoked to bite, though ever so rudely assaulted. They hiss, dart out their forked tongues, erect themselves on the tail, and call up all their terrors to intimidate their aggressors, but seem to consider their teeth as unnecessary instruments of defence, and never attempt to use them. Even among the largest of this kind, the teeth are never employed, in the most desperate engagements. When a hare or a bird is caught, the teeth may serve to prevent such small game from escaping; but, when a buffalo or a tiger is to be encountered, it is by the strong folds of the body, by the fierce verberations of the tail, that the enemy is destroyed: by this twining round, and drawing the knot with convulsive energy, this enormous reptile breaks every bone in the quadruped's body, and then, at one morsel, devours its prey.

Hence we may distinguish the unvenomous tribe into two kinds: first, into those which are seldom found of any considerable magnitude, and that never offend animals larger or more powerful than themselves, but which find their chief protection in flight, or in the doubtfulness of their form; secondly, into such as grow to an enormous size, fear no enemy, but indiscriminately attack all other animals, and devour them. Of the first kind is the Common Black Snake, the Blind Worm, the Esculapian Serpent, the Amphibæna, and several others. Of the second, the Liboya, the Boiguacu, the Depona, and the Boiquatrara.

The BLACK SNAKE is the largest of English serpents, sometimes exceeding four feet in length. The neck is slender; the middle of the body, thick; the back and sides, covered with small scales; the belly, with oblong, narrow, transverse plates; the colour of the back and sides is of a dusky brown; the middle of the back marked with two rows of small black spots, running from the head to the tail; the plates on the belly are dusky; the scales on the sides are of a bluish white; the teeth are small and ferrated, lying on each side of the jaw, in two rows. The whole species is perfectly inoffensive, taking shelter in dung-hills, and among bushes in moist places; whence they seldom remove, unless in the midst of the day, in summer, when they are called out by the heat, to bask themselves in the sun.

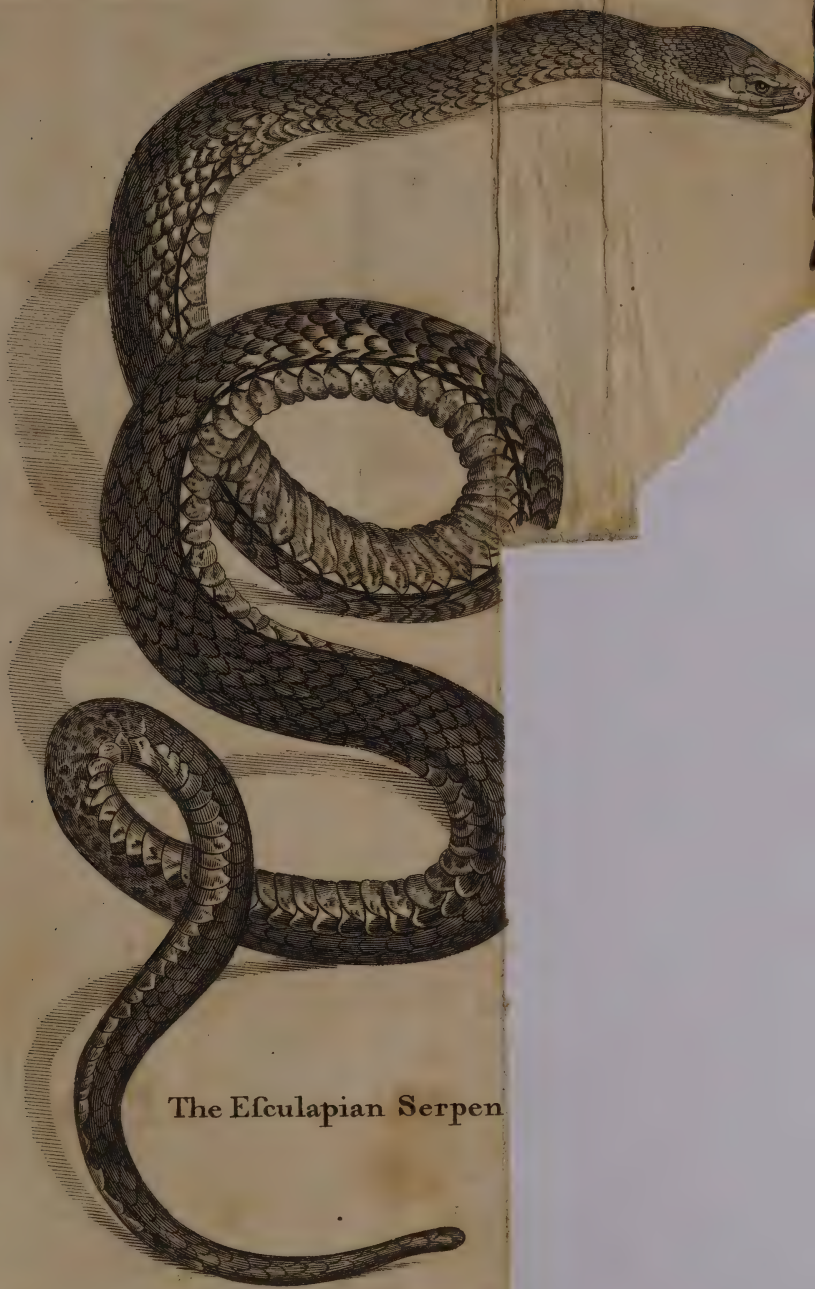
The black snake preys upon frogs, insects, worms, mice, and young birds; and, considering the smallness of the neck, it is amazing how large an animal it will swallow. The black snake of Virginia, which is larger than ours, and generally grows to six feet long, takes a prey proportionable to its size; partridges; chickens and young ducks. It is generally found in the neighbourhood of the hen-roost, and will devour the eggs, even while the hen is sitting upon them: these it swallows whole; and often, after it has done the mischief, will coil itself round in the nest.

The whole of this tribe are oviparous, laying eighty or an hundred eggs at a time, in dung-hills or hot-beds; the heat of which, aided by that of the sun, brings them to maturity. During winter, they lie torpid, in banks of hedges, and under old trees.

The BLIND WORM is another harmless reptile, with a formidable appearance. The usual length of this species is eleven inches. The eyes are red, the head small, the neck still more slender; from that part the body grows suddenly, and continues of an equal bulk to the tail, which ends quite blunt. The colour of the back is cinereous, marked with very small lines; composed of minute black specks. The motion of this serpent is slow; from which, and from the smallness of the eyes, are derived its names; some calling it the slow, and some the Blind Worm. Like all the rest of the kind, in our climates, they lie torpid during winter, and are sometimes found, in vast numbers, twisted together. This animal, like the former, is perfectly innocent; like the viper, however, it brings forth its young alive.

The AMPHISBÆNA, or the Double-headed Serpent, is remarkable for moving along with either the head or the tail foremost: whence it has been thought to have two heads. Some have affirmed that its bite is dangerous; but this must be a mistake, as it wants the fangs, and consequently the elaboratory that prepares the poison.

The ESCULAPIAN SERPENT of Italy is among this number. It is there suffered to crawl about the chambers, and often gets into the beds where people lie. It is a yellow serpent, of about an ell long; and, though innocent, yet will bite when exasperated. They are said to be great destroyers



The Esculapian Serpen

destroyers of mice ; and this may be the reason why they are taken under human protection. The BOYUNA of Ceylon is equally a favourite among the natives ; and they consider the meeting it as a sign of good luck. The SURINAM SERPENT, which some improperly call the Amodytes, is equally harmless and desirable among the savages of that part of the world. They consider themselves as extremely happy, if this animal comes into their huts. The colours of this serpent are so many and beautiful, that they surpass all description ; and these, perhaps, are the chief inducements to the savages, to consider its visits as so very fortunate. A still greater favourite is the PRINCE of SERPENTS, a native of Japan, that has not its equal for beauty. The scales which cover the back are reddish, finely shaded, and marbled with large spots of irregular figures mixed with black. The fore part of the head is covered with large, beautiful scales ; the jaws bordered with yellow ; the forehead marked with a black marbled streak, and the eyes handsome and lively. But the GERENDA of the East Indies is the most honoured and esteemed. To this animal, which is finely spotted with various colours, the natives of Calicut pay divine honours ; and while their deity lies coiled up, which is its usual posture, the people fall upon their faces before it, with stupid adoration. The African Gerenda is larger, and worshipped in the same manner, by the inhabitants of the coasts of Mozambique.

But, in the larger tribe of serpents, there is nothing but danger to be apprehended. This formidable class, though without venom, have something frightful in their colour, as well as their size and form. They want that vivid hue with which the savages are so much pleased in the lesser kinds. They are all found of a dusky colour, with large teeth, which are more formidable than dangerous.

The first of this class, is the Great JIBOYA of Java and Brazil, which Leguat affirms, he has seen fifty feet long. The largest animal of this kind, which has been brought into Europe, is but thirty-six feet long ; and it is probable, that much greater have been seen and destroyed, before they were thought worth sending so far, to satisfy European curiosity. The most usual length, however, of the jiboya, is about twenty feet, and the thickness in proportion. The teeth are small in proportion to the body ; nor are they used, but when it seizes the smallest prey.

The

THE BOIGUACU is supposed to be the next in magnitude, and has often been seen to swallow a goat whole. It is thickest in the middle of the body, and grows shorter and smaller towards the head and the tail. It has a double row of sharp teeth in each jaw, shining like mother-of-pearl. The head is broad, and over the eyes it is raised into two prominences: near the extremity of the tail there are two claws, resembling those of birds.

These serpents lie hid in thickets, whence they fall out unawares, and raising themselves upright on their tails, will attack both men and beasts. They make a loud hissing noise when exasperated; and sometimes winding up trees, will dart down upon travellers, and twist themselves so closely round their bodies, as to dispatch them in a very few minutes.

To this class of large serpents, we may refer the DEPONA, a native of Mexico, with a very large head, and great jaws. The mouth is armed with cutting, crooked teeth, among which there are two longer than the rest, placed in the fore part of the upper jaw, but very different from the fangs of the viper. All round the mouth there is a broad scaly border; and the eyes are so large, that they give it a very terrible aspect. The forehead is covered with very large scales, on which are placed others, that are smaller, curiously ranged: those on the back are greyish. Each side of the belly is marbled with large square spots, of a chesnut colour; in the middle of which is a spot, which is round and yellow. They avoid the sight of man; and consequently, never do much harm.

C H A P. XXXV.

Of Insects in general.—Observations on the Bee, the Ant, and the Silk-worm.—The inferiority and imperfection of this Class of Animals.—Their Instincts.—Uses.—Nature.—Classification.—Insects without Wings.—Grasshoppers, &c.—Moths and Butterflies.—Other Flies.—Zoophytes.

THERE are many reasons which operate against the possibility of exhibiting a complete history of insects.—Their numbers infinitely exceed that of all the other classes of animals. Remote from our habits, and in general, by their minuteness placed beyond the scope of our observation, too much of what naturalists have produced upon these subjects,

subjects, is liable, at least, to suspicion. We can contemplate, for instance, with admiration, the wonderful fabrick of the bee, or the industry of the ant; but when we would penetrate into the *realm* of the one, or the *republic* of the other, we necessarily subject ourselves to much deception, and the imagination is called in to supply where observation is necessarily deficient. Of the silk-worm itself we can only relate, that it proceeds from the egg a naked caterpillar; it spins its curious thread, becomes a chrysalis, and ends its existence as a winged animal. All, therefore, that appears necessary in this department, is, a general account of the nature of the insect world in general, and to draw the line of distinction between them and the other classes of animated beings.

There is, indeed, another reason why the attention should not be too much diverted into this minute channel; and that is, its want of importance: for, however the admirers of butterflies and caterpillars may chuse to magnify their favourite pursuit, it cannot be doubted, that the insect tribe are of a nature extremely inferior to all the other inhabitants of the earth.

Of all living beings, man offers the most wonderful variety in his internal conformation; quadrupeds come next; and other animals follow in proportion to their powers or their excellencies. Insects seem above all others the most imperfectly formed: from their minuteness, the dissecting knife can go but a short way in the investigation; but one thing argues an evident imperfection; which is, that many of them can live a long time, though deprived of those organs which are necessary to life in the higher ranks of nature. Many of them are furnished with lungs and a heart like nobler animals; yet the caterpillar continues to live, though its heart and lungs, which is often the case, are entirely eaten away.

But it is not from their conformation alone, that insects are inferior to other animals, but from their instincts also. It is true, that the ant and the bee present us with very striking instances of assiduity; but, how far are their's beneath the marks of sagacity exhibited in the hound or the stag! A bee taken from the swarm is totally helpless and inactive, incapable of giving the smallest variation to its instincts; it has but one single method of operating; and, if put from that, it can turn to no other. In the pursuits of the hound, there is something like a choice; in the labours of the bee, the whole appears like necessity or compulsion.

If

If insects be considered as bearing a relation to man, and as assisting him in the pleasures or necessities of life, they will, even in this respect, sink in the comparison with the larger tribes of nature. It is true, that the bee, the silkworm, the cochineal fly, and the cantharides, render him signal services; but how many others of this class, are either noxious, or totally unserviceable to him. Even in a country like ours, where all the noxious animals have been reduced by repeated assiduity, the insect tribes still maintain their ground, and are but too often unwelcome intruders upon the fruits of human industry. But, in more uncultivated regions, their annoyance and devastations are terrible. What an uncomfortable life must the natives lead in Lapland, and some parts of America, where, if a candle be lighted, the insects swarm in such abundance, as instantly to extinguish it with their numbers; where the inhabitants are obliged to smear their bodies and faces with tar, or some other composition, to protect them from the puncture of their minute enemies; where, though millions are destroyed, famished millions are still seen to succeed, and to make the torture endless!

Their amazing number is also an argument of their imperfection. It is a rule that obtains through all nature, that the nobler animals are slowly produced, and that nature acts with a kind of dignified œconomy; but the meaner births are lavished in profusion; and thousands are brought forth merely to supply the necessities of the more favourite objects of creation. Of all productions in nature, insects are the most numerous. Vegetables that cover the surface of the earth, bear no proportion to their multitudes; and though, at first sight, herbs of the field seem to be the parts of organized nature produced in the greatest abundance, yet, upon minuter inspection, we shall find every plant supporting a number of scarce perceptible creatures, that fill up the various stages of youth, vigour and age, in the compass of a few days' existence.

All other animals are capable of some degree of education; their instincts may be suppressed or altered; the dog may be taught to fetch and carry; the bird to whistle a tune, and the serpent to dance; but the insect has but one invariable method of operating; no arts can turn it from its instincts; and indeed its life is too short for instruction, as a single season often terminates its existence.

For these reasons, the insect tribe are deservedly placed in the lowest rank of animated nature; and, in general, they

they seem more allied to the vegetables on which they feed, than to the nobler classes above them. Many of them are attached to one vegetable, often to a single leaf; there they increase with the flourishing plant, and die as it decays; a few days fill up the measure of their contemptible lives; while the ends for which they were produced, or the pleasures they enjoyed, to us at least, are utterly unknown.

Yet, while we are thus fixing the rank of a certain class of animals, it seems necessary to define the nature of those animals which are thus degraded. Definitions, in general, produce little knowledge; but here, where the shades of nature are so intimately blended, some discrimination is necessary to prevent confusion. The smallness of the animal, for instance, does not constitute an insect; for then, many of the lizard kind, which are not above two inches long, would come under this denomination; and if the smaller lizards, why not the crocodile, which would be a terrible insect indeed? In the same manner, smallness, with a slow, creeping motion, does not constitute an insect; for, though snails might be called insects with some propriety, the whole tribe of sea shell-fish would then have equal pretensions, and a very troublesome innovation would be brought into our language, which is already formed. Excluding such animals, therefore, from the insect tribe, we may define insects to be *little animals without red blood, bones or cartilages, furnished with a trunk, or else a mouth, opening lengthwise, with eyes which they are incapable of covering, and with lungs which have their openings on the sides*. This definition comprehends the whole class of insects, whether with or without wings, whether in their caterpillar or butterfly state, whether produced in the ordinary method of generation between male and female, or from an animal that is itself both male and female, or from the same animal cut into several parts, and each part producing a perfect animal.

Hence it appears, that in this class of animals there are numerous distinctions. Almost every species has its own distinct history, and exhibits manners, appetites, and modes of propagation peculiarly its own. In the larger ranks of existence, two animals that nearly resemble each other in form, will be found to have a similar history; but here, insects almost entirely alike, will be often found perfectly dissimilar, as well in their manner of bringing forth and subsisting, as in the changes which they undergo during their short lives.

Upon casting a slight view over the whole insect tribe, just when they are supposed to rouse from their state of annual torpidity, when they begin to feel the genial influence of spring, and again exhibit new life in every part of nature; their numbers and their varieties seem to exceed all powers of calculation; and they are indeed too great for description. When we look closer, however, we shall find some striking similitudes, either in their propagation, their manners, or their form, that give us a hint for grouping several of them into one description, and thus enabling us to avoid the labour of a separate history for every species.

In a cursory inspection of the insect tribe, the first animals that offer themselves are those which want wings, that appear crawling about on every plant, and on every spot of earth which we regard with any degree of attention. Of these, some never obtain wings at any period of their existence, but are destined to creep on the vegetable, or the spot of earth where they are stationed, for their whole lives. On the contrary, others are only candidates for a more happy situation, and only wait their growing wings, when they may be said to arrive at their state of full perfection.

Those that never have wings, but creep about till they die, may be considered as constituting the *first* class of insects. All these, the flea and the wood-louse only excepted, are produced from an egg; and, when once they break the shell, they never suffer any further change of form but continue to grow larger till they die. Thus the louse or the spider are produced from an egg, never suffering any alteration when once they are excluded; but, like the chicken or the duck, remaining invariably the same, from their birth to their dissolution. The strength of some of this class is almost incredible. A flea will draw a chain a hundred times heavier than itself, and will eat ten times its own size of provision in a single day.

The second order of insects consists of such as have wings; but which, when produced from the egg, have those wings cased up in such a manner as not to appear. This casing up of the wing, however, does not prevent the animal's running, leaping, and moving with its natural celerity; but, when the case bursts, and the wings have a power of expanding, all its motions become more extensive, and the animal arrives at full perfection. Thus the grasshopper, the dragon fly, and the earwig, have their wings at first bound down; but when the skin, that, like
a pair

a pair of staves, kept them confined, bursts, they are then expanded, and the animal pursues the purposes for which it was produced. There is one animal of this class, called the *Ephemera*, which lives in this state but a single day.

The third order of insects is of the moth and butterfly kind. These all have four wings, each covered with a mealy substance of various colours, which, when handled, comes off upon the fingers; and, if examined by the microscope, will appear like feathers, with which the wing is nicely embroidered all over. These insects also are produced in a manner peculiar to themselves. They are first hatched from an egg, whence proceeds a caterpillar, that eats, and often casts its skin; the caterpillar having divested itself for the last time, assumes a new covering, which is called a chrysalis, or the cone in the silk-worm, in which it continues hidden, till it comes forth a perfect moth and butterfly.

The fourth order is of those winged insects which come from a worm, instead of a caterpillar, and yet go through changes similar to those which moths and butterflies are seen to undergo. They are first excluded from the egg as a worm, and then become a chrysalis; in some, their wings and legs are seen; in others, the animal is quite detached from the cone in which it is concealed; but all, at length, break their prison, and come out perfect winged animals; some furnished with two wings, and some with four. The wings of all these differ from those of the butterfly and moth kind, by not having the mealy matter which is ever found on the wings of the former. In this class we may place the numerous tribes of gnats, beetles, bees and flies.

To these we add, as a fifth order, a numerous tribe lately discovered, to which naturalists have given the name of Zoophytes. These do not go through the ordinary forms of generation, but may be propagated by dissection. Some of these, though cut into an hundred parts, still retain life in each, and are endued with such a vivacious principle, that every part will, in a short time, become a perfect animal. They seem a set of creatures placed between animals and vegetables, and make the shade that connects animated and insensible nature. To this class belong the polypus, the earth-worm, all the varieties of the sea-nettle; and to it may probably be referred those curious creatures which produce the coral, the sponge, and other singular and similar marine productions.

It is impossible to finish our short review of nature without observing the wonderful harmony and connection that subsists between all the different branches; without observing how happily one part supports another, and how every thing contributes to the general good. How infinitely great must be that ETERNAL MIND who framed all with such amazing skill—Who sees with a single glance the operation and mechanism of the whole, from the minute anatomy of the ant, to those innumerable worlds, those vast and splendid orbs that gild the unbounded expanse of the universe !

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